CITY OF MANCHESTER.

REPORT

ON THE

Health of the City of Manchester,

1904,

BY

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MANCHESTER:
HENRY BLACKLOCK & CO. LIMITED, PRINTERS, ALBERT SQUARE.
1905.

Public Health Office,

Town Hall, Manchester,

July 20th, 1905.

My Lord Mayor, Aldermen, and Members
of the City Council.

I have the honour to submit to you the Annual Report on the Health of the City of Manchester for the year 1904.

The death-rate was close on 21 per 1,000, a figure which we are coming to regard as unduly high.

Diarrhoea was especially prominent as a cause of death, and it was more especially in infancy and at advanced years that the mortality contrasted unfavourably with that of the years immediately preceding.

Smallpox continued to prevail, though to a diminished extent. The influence of unrecognised cases in spreading the disease is conspicuous. No spread took place from the Hospital, and it may fairly be claimed that the outbreak of Smallpox was brought under control in Manchester at a small expense as compared with most, if not all, other towns seriously threatened.

The figures relating to Vaccination do not differ from those usually tabulated.

In my opinion we shall not be free from periodic alarms until obligatory Vaccination at the age of 12 has become the law of the land, and on April 13, 1904, the City Council resolved to petition in favour of the Re-Vaccination Bill, 1904, a measure which embodied this requirement.

The isolation of Scarlet Fever in Hospital as a preventive measure has been called in question in recent years. On analysis of the facts in the Report for 1901 I came to the conclusion that the benefits of isolation decidedly exceed the drawbacks.

In 1904 the facts are given fully both for Monsall Hospital and for the Baguley Sanatorium.

In regard to Diphtheria, it seems probable that, if contacts found to present evidences of Bacteriological Diphtheria could be ascertained and isolated, the disease might be still further reduced.

The most urgent need, however, appears to be the administration by medical men of Antitoxin directly on being called in to attend a case.

A study of Enteric Fever as it occurred in Manchester in 1904 indicates that it is chiefly propagated by direct infection, and that overlooked cases have much to do with its persistence in the City.

In Autumn it is probably propagated under the cloak of Diarrhoea, and probably flies take some share in the increase. Shellfish also play a not unimportant part in its dissemination: the layings from which mussels are brought into the City require attention.

A study of Summer Diarrhoea suggests that the autumnal increase is due in great measure to the movements of the house-fly, and that the protection of food from the visits of flies should receive increased attention.

Evidence is furnished of the extent to which Diarrhoea is conveyed from person to person. In view of the facts adduced, our preventive measures require to be reconsidered.

The education of girls in practical measures of domestic hygiene would appear from this study to be urgently called for.

Increased attention is everywhere being given to the factors causing a high mortality in infancy and childhood, and I have, therefore, analysed the causes of death in infancy.

Improvement will probably be effected chiefly through the Education Authority, but also, in part, by the strengthening and extension of the work carried on by the Health Visitors.

Useful work has been done by the Visitors of the Ladies' Public Health Society, more particularly as regards the instruction of mothers in the practice of infant feeding.

The work done in connection with the notification of Phthisis shows a slight falling-off in 1904, but only in so far as cases are concerned. This is, however, in all probability, temporary. The advantage of having 20 beds in the noble Sanatorium which Mr. W. J. Crossley, J P., has erected at Delamere, and the provision now being made for the treatment of 30 cases at Clayton Hospital, may be expected to lead to an extension of this most useful department of Public Health.

The death-rate from Tubercular Phthisis during the last two years shows a diminution.

The Annual Report of the Veterinary Surgeon shows that a steady improvement is taking place in the supply of milk to the City, though no diminution in Tuberculosis of the Udder has been apparent prior to 1904. It is hoped that the advance manifest in this year will continue.

The cooling of the milk supply in Summer would be a beneficent reform, and a brief statement is made of the efforts put forth to secure this object.

The Midwives' Act, 1902, has only come into full operation during the present year. An account is given of the scope of this important measure, and of the action hitherto taken to give effect to it. There is no doubt that the lives of mothers have been exposed to excessive risks through the ignorance of the present race of midwives, and that great efforts will be needed to alter their mode of practice, and gradually to introduce an educated and trained class of women. Doubtless, that will be the final outcome of the Act, amended, as it is certain to be, from time to time.

The Sections in this Report relating to Smallpox, Scarlet Fever, Diphtheria, and Tubercular Phthisis have been prepared by Dr. Forbes.

The report of the Medical Superintendent for Monsall Hospital is a record of much valuable work in various directions, and deserves careful perusal. In particular, attention may be directed to the skilful treatment of cases of Puerperal Sepsis by Dr. Gordon. It is to be hoped that this most useful branch of preventive work will grow in his hands, and that practitioners will send such cases into Monsall at the earliest possible moment.

At the inclusion of Withington and Moss Side in the City, the Baguley Hospital for Infectious Diseases, which received (and receives) cases from Withington, Didsbury, Chorlton-cum-Hardy, Moss Side, Levenshulme, Cheadle, Bowdon, and the Bucklow Joint Hospital Board's District, came under the management of the Manchester Sanitary Committee. A report by Dr. Rhodes (the Medical Superintendent) will be found following that by Dr. Gordon.

The facts set forth by him testify to careful and successful management.

The Chairman and Members of the Hospitals Sub-Committee have given much thought and attention to all the Hospitals for Infectious Disease.

The statement made under the Factory and Workshops Act, 1901, marks the termination of a considerable piece of useful work, and summarises a year's useful work in various directions.

I am indebted to Mr. Rook for a summary of the business transacted by the Sanitary Department during the year.

From Mr. Williamson also, and from Mr. Holburn, statements are given of the work done in their respective departments, so far as each relates to the Public Health Acts.

Some subjects of great importance have not been dealt with in this Report, or only in a perfunctory manner, as it did not seem possible to treat them adequately in an Annual Report—at all events in the first instance.

Notably is this the case with the question of Housing, to which I hope to be able to devote increased attention.

I have the honour to be,

My Lord Mayor, etc.,

Your obedient Servant,

JAMES NIVEN.

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STATISTICAL.

The following are general statistics for the year 1904 :—

Area of the City in acres		12,910
Estimated population at the middle of 1904	Males 270,275; Females 288,060	558,335
No. of persons per acre		43
No. of inhabited houses at the Census taking, 1901		108,957
No. of uninhabited houses at the Census taking, 1901		8,559
Total No. of tenements		112,854
No. of tenements at the Census taking, 1901, 4 rooms and under		61,572
Average No. of persons at the Census taking, 1901, in houses of 4 rooms and under		4·25
Persons married per 1000 of population in the Manchester, Chorlton, and Prestwich Unions		16·46
Births in the City of Manchester	Males 8,818; Females 8,535	17,353
Annual birth-rate per 1000 of population		31·1
Deaths	Males 6,102; Females 5,564	11,666
Annual death-rate per 1000 of population	Males 22·58; Females 19·32; persons	20·89
Deaths under 1 year of age per 1000 births		186·7
Excess of registered births over deaths		5,687
Estimated increase of population during the year		4,004

It should be observed that these figures do not relate to the districts of Withington and Moss Side incorporated in November last. It is an accusation levelled against large towns that by the incorporation of the districts surrounding them they lower unduly the general level of their mortality, and conceal the very bad condition prevailing at the centre.

There is, however, in reality, no disposition to cloak over the bad spots, and the improvement in the health statistics of the City resulting from incorporation is only a part of the improvement which rightfully belongs to the City as part of the movement outwards of its workers.

The birth-rate in 1904 again shows a decline on that of 1903.

The death-rate of 21 per 1,000 places Manchester last but one in the list of 76 great towns.

Ten years ago this would not have been accounted a high death-rate. Now we begin to regard it with disappointment.

The infantile death-rate is higher than that of last year, and is somewhat in excess of the average for ten years.

The figure of 187 deaths per 1,000 infants born is a formidable one, representing as it does a death-rate probably double of what ought to prevail.

It is the product of industrial town life, and represents its worst elements with their ignorance of domestic duties, dirt, and vice.

In so far as these are eradicable it is reducible, and possibly, by judicious measures, it may be found possible to make the care of the infants a lever to a higher conception of life.

During the last five years the number of births has exceeded the number of deaths to an extent considerably above the increase of the population estimated by the Registrar-General.

It does not, therefore, follow that the population of the City is increasing beyond the estimated amount. It is probable, however, that the City and its environs are increasing at an accelerated pace.

The following table taken from the Registrar-General's Annual Summary shows the position of Manchester among the great town as regards mortality.

Inasmuch as the infantile mortality is exceeded by that of eight other large towns, that of adults and old people must be correspondingly high; and it is, in fact, the high mortality in adult life which causes Manchester to remain persistently close to the bottom of the list.

TABLE 1.—RECORDED AND CORRECTED DEATH-RATES PER 1,000 PERSONS LIVING IN 76 GREAT TOWNS IN 1904.

TOWNS, in the order of their Corrected Death-rates	Standard Death-rate *	Factor for Correction for Sex and Age Distribution †	Recorded Death-rate, 1904	Corrected Death-rate, 1904 ‡	Comparative Mortality Figure, 1904 §
Cols.	1	2	3	4	5
England and Wales	18·194	1·0000	16·23	16·23	1,000
England and Wales, less the 76 Towns............	18·83	0·9662	15·40	14·88	917
76 Towns	17·13	1·0621	17·24	18·31	1,128
Hornsey.....................	15·96	1·1400	8·44	9·62	593
King's Norton	17·40	1·0456	10·56	11·04	680
Willesden	16·96	1·0728	11·19	12·00	739
Hastings	18·92	0·9616	13·16	12·65	779
Walthamstow...............	17·21	1·0572	12·17	12·87	793
Handsworth (Staffs.)......	16·53	1·1007	11·80	12·99	800
Leyton	17·69	1·0285	12·67	13·03	803
Southampton...	18·30	0·9942	13·74	13·66	842
East Ham	17·06	1·0665	13·08	13·95	860
Smethwick..................	16·63	1·0940	12·84	14·05	866
Devonport..................	17·35	1·0486	13·42	14·07	867
Croydon.....................	17·75	1·0250	13·80	14·15	872
Reading.....................	17·59	1·0343	13·85	14·33	883
Bournemouth	17·22	1·0566	13·60	14·37	885
Northampton...............	17·50	1·0397	13·84	14·39	887
Tottenham..................	16·86	1·0791	13·86	14·96	922
Ipswich	18·63	0·9766	15·50	15·14	933
Coventry	18·15	1·0024	15·33	15·37	947
Leicester	17·05	1·0671	14·51	15·48	954
Barrow-in-Furness.........	16·01	1·1364	13·75	15·63	963
Wolverhampton...	17·59	1·0343	15·48	16·01	986
Bristol	17·73	1·0262	15·62	16·03	988
Great Yarmouth	19·88	0·9152	17·53	16·04	988
Cardiff	16·73	1·0875	14·83	16·13	994
Burton-on-Trent	16·93	1·0747	15·02	16·14	994
Rotherham	17·59	1·0343	15·80	16·34	1,007
Brighton.....................	18·46	0·9856	16·60	16·36	1,008
West Bromwich............	18·04	1·0085	16·27	16·41	1,011
Derby........................	16·88	1·0778	15·30	16·49	1,016
Aston Manor...............	16·41	1·1087	15·01	16·64	1,025
Wallasey	16·63	1·0940	15·22	16·65	1,026
York	17·67	1·0297	16·23	16·71	1,030
Halifax	16·79	1·0836	15·45	16·74	1,031

* The Standard Death-rate signifies the rate at all ages calculated on the hypothesis that the rates for each sex at each of twelve age-periods in each town were the same as in England and Wales during the ten years 1891–1900, the rate at all ages in England and Wales during that period having been 18·21 per 1,000.

† The Factor for Correction is obtained by dividing the Standard Death-rate in England and Wales by the Standard Death-rate in each town, and is the figure by which the Recorded Death-rate should be multiplied in order to correct for variations of sex and age distribution.

‡ The Corrected Death-rate is the Recorded Death-rate multiplied by the Factor for Correction.

§ The Comparative Mortality Figure represents the Corrected Death-rate in each town compared with the Recorded Death-rate at all ages in England and Wales in 1902, taken as 1,000.

TABLE I. (continued)—RECORDED AND CORRECTED DEATH RATES PER 1,000 PERSONS LIVING IN 76 GREAT TOWNS IN 1904—*continued.*

TOWNS, in the order of their Corrected Death-rates	Standard Death-rate*	Factor for Correction for Sex and Age Distribution †	Recorded Death-rate, 1904	Corrected Death-rate, 1904‡	Comparative Mortality Figure, 1904 §
Cols.	1	2	3	4	5
Newport, Mon.	16·84	1·0804	15·67	16·93	1,043
West Hartlepool	16·57	1·0980	15·46	16·98	1,046
Portsmouth	17·75	1·0250	16·88	17·30	1,066
Grimsby	16·99	1·0709	16·22	17·37	1,070
Norwich	19·05	0·9551	18·23	17·41	1,073
London	17·31	1·0511	16·63	17·48	1,077
West Ham	17·01	1·0696	16·45	17·59	1,084
Plymouth	18·66	0·9750	18·54	18·08	1,114
Sheffield	16·88	1·0778	16·79	18·10	1,115
Stockton-on-Tees	17·35	1·0486	17·56	18·41	1,134
Nottingham	17·27	1·0535	17·70	18·65	1,149
Huddersfield	16·96	1·0728	17·51	18·78	1,157
Walsall	17·18	1·0590	17·88	18·93	1,166
Bury	16·25	1·1196	16·92	18·94	1,167
South Shields	17·19	1·0584	17·90	18·95	1,168
Hull	17·75	1·0250	18·56	19·02	1,172
Bolton	16·09	1·1308	16·91	19·12	1,178
Blackburn	16·09	1·1308	16·93	19·14	1,179
Swansea	16·96	1·0728	18·02	19·33	1,191
Bradford	16·46	1·1053	17·64	19·50	1,201
Gateshead	17·26	1·0541	18·51	19·51	1,202
Rochdale	16·45	1·1060	17·71	19·59	1,207
Leeds	16·68	1·0908	18·02	19·66	1,211
Tynemouth	17·62	1·0326	19·22	19·85	1,223
Sunderland	17·64	1·0314	19·46	20·07	1,237
Oldham	16·18	1·1245	18·19	20·45	1,260
Newcastle-on-Tyne	16·87	1·0785	19·36	20·88	1,287
Merthyr Tydfil	17·16	1·0603	19·73	20·92	1,289
Birkenhead	17·07	1·0658	19·64	20·93	1,290
Preston	16·63	1·0940	19·20	21·00	1,294
Rhondda	16·54	1·1000	19·11	21·02	1,295
Stockport	16·84	1·0804	19·65	21·23	1,308
Birmingham	16·91	1·0759	19·88	21·39	1,318
Warrington	16·89	1·0772	19·90	21·44	1,321
Middlesbrough	16·71	1·0888	19·78	21·54	1,327
Bootle	16·50	1·1027	19·61	21·62	1,332
Burnley	16·14	1·1273	19·51	21·99	1,355
St. Helens	16·79	1·0836	20·89	22·64	1,395
Hanley	16·67	1·0914	20·89	22·80	1,405
Salford	16·47	1·1047	21·18	23·40	1,442
Wigan	16·51	1·1020	21·48	23·67	1,458
Manchester	16·29	1·1169	21·27	23·76	1,464
Liverpool	17·00	1·0702	22·59	24·18	1,490

For Notes * † ‡ § see page 3.

The principal causes of death during the year were :—

Phthisis	1106	Premature Birth		373
Tuberculosis of Organs other than the Lungs	385	Nephritis and Bright's Disease		242
Diseases of the Heart ...	1038	Convulsions		190
Cerebral Hæmorrhage, Apoplexy, Hemiplegia	408	Inflammation of the Brain ...		134
Pneumonia	1101	Diarrhœa and Dysentery ..		761
Bronchitis	1216	Measles	425	
Atrophy Debility (chiefly in infants)	620	Scarlet Fever...	85	
Old Age...	275	Whooping Cough	280	889
		Diphtheria	99	
		Malignant Disease		452

A short résumé of the principal causes of death is useful in reminding us of the true proportions of the evils which we are engaged in combating. To chest disease is assigned nearly one-third of all deaths, and it is desirable to recall the fact that in respect of Pneumonia and Bronchitis in adults, especially of the former, Manchester takes the lowest position among the great towns.

In a previous analysis of this subject I have given reasons for believing that, though we may not disregard atmospheric pollution as a factor in causing Pneumonia, a greater effect must be ascribed to the insanitary conditions in the rear of the houses. Probably, also, the high mortality from Pneumonia is partly to be ascribed to alcoholism.

To diseases of the circulation is ascribed nearly one-eleventh of the total death-rate. This, again, is a high proportion. The excess must be associated partly with the mortality from chest diseases and partly with the excessive consumption of alcohol.

To Premature Birth, Wasting Diseases, Convulsions, and Diarrhœa are due 1944 deaths, or one-sixth of the total. These deaths are due, in the main, to malnutrition either of the mother or of the infant, and are largely preventable, though the measures required to prevent them are at present only in the initial stages.

Measles and Whooping Cough, as usual, exact a high mortality.

This is largely due to the aggregation of susceptible children in the infant department of schools.

As mentioned in my report for 1903, Dr. Newsholme has strongly urged that, on grounds of economy and health, children under 7 years of age should not be received into school.

There are, I think, strong grounds for this contention, though, as regards Measles, I do not think that their exclusion from school would much improve the position of the schools.

On the other hand, in proportion as teaching of infants under 7 is efficient, the effects on their health is bad.

In proportion as it is bad, it engenders habits of inattention not easily thrown off.

Valuable space is taken up in the school to the detriment both of the infants and of older scholars.

If, however, the public demand that infants of tender age shall be taken into school, adequate provision should be made, and there should be no grumbling over the expense necessary to provide ample school room and the very skilled and special teaching staff required to ensure proper attention to the physical and mental well-being of such young children.

Table 2 is one which will be examined with interest in view of the distress which prevailed during the past winter.

It will be seen that an increase in the weekly number of paupers relieved is again shown, and that the increase obtains only in persons receiving outdoor relief.

Last year the price of flour was considerably higher than in other recent years, and mutton also had risen in price. The price of coal, however, was somewhat lower.

Owing, chiefly, to depression in the cotton trade and allied industries, a large number of persons were thrown out of employment during the year, and the distress experienced was very great.

I have no data of my own to give on the subject.

It is to this cause that the increase in the relief administered is due. Besides the relief thus given out of the rates, large sums were given by charitable bodies, and the situation was in this way mitigated. Many citizens also expended themselves freely in their efforts to organize and direct the provision of work and aid in kind.

Table 2.—Township of Manchester.—Prices paid by the Guardians for Flour, Butchers' Meat, and Coal, also the average Weekly Number of Persons in Receipt of Relief, during the Years 1887–1904.

Year ending	Prices of Provisions						Pauperism		Birth-rate per 1,000
	Flour per Sack of 280lbs.	Butchers' Meat, per lb.			Coal, per ton		Average number of Paupers relieved in each week		
		Beef		Mutton	Engine	House	Indoor	Outdoor	
		Coarse	Fine						
1887	25/2 to 30/6	-/3¾	-/6½	-/6½	5/6	8/4	3123	877	33·9
1888	24/- to 29/3	-/3¾	-/6½	-/6½	5/5	8/3	3130	713	33·3
1889	24/11 to 31/2	-/4½	-/6½	-/6½	5/8	8/7	3037	632	33·1
1890	24/9 to 29/11	-/5	-/7	-/7	7/-	9/9	2998	498	31·8
1891	27/3 to 28/11	-/4¼	-/6½	-/6½	8/8	11/2	3118	466	33·8
1892	26/4 to 28/5	-/4	-/6¼	-/6¼	7/6	10/2	3251	551	33·4
1893	21/8 to 25/1	-/3⅞	-/6¼	-/6¼	6/5	10/0	3277	586	33·4
1894	17/2 to 23/9	-/3¾	-/6	-/6	7/1	10/10	3328	395	31·8
1895	15/6 to 21/-	-/3¾	-/6	-/6	5/6	10/3	3343	618	33·4
1896	16/6 to 24/-	-/3⅝	-/5¾	-/5¾	5/7	9/1	3348	533	32·8
1897	17/3 to 33/9	-/3½	-/5⅝	-/5⅝	5/9	8/8	3476	697	32·9
1898	26/7 to 33/8	-/3½	-/5½	-/5½	6/2	8/4½	3519	732	32·3
1899	20/11 to 23/-	-/3½	-/5⅝	-/5⅝	7/5	9/11	3232	597	32·2
1900	20/9 to 22/9	-/3½	-/5½	-/5⅝	11/9¾	14/2½	3189	686	32·4
1901	21/4 to 23/3	-/3⅝	-/5⅝	-/5⅝	11/8	15/2	3403	817	28·7
1902	20/11 to 24/3	-/3⅞	-/5¾	-/5¾	9/3	13/5½	3492	752	33·0
1903	21/10½ to 23/3	-/4⅜	-/6	-/5½	9/-	12/11¼	3521	812	31·7
1904	23/- to 28/6	-/4⅜	-/6	-/6	8/2	11/11	3486	1459	31·1

The Charity Organization Society has done admirable and discriminating work in assisting poor and deserving families.

It is much to be desired that the efforts of some members of the Society to co-ordinate the work of charities and charitable persons, through the agency of this Society, may be crowned with success.

The aid given by the Society is dependent on two conditions. The assistance needed must be of a temporary character, and is given only to deserving persons.

A problem, however, which needs solving in some practical fashion is this.

How is it possible, by a system of loans, to supplement the resources of deserving families at that period when the children are young, and the income inadequate to their maintenance, to such an extent as to ensure that all the members have enough food and clothing.

The solution of this problem involves in part instruction to poor families in the manner in which the income must be spent so as to give the maximum result in physical upbuilding at a minimum of cost.

Could even this part of the solution be attained, and I do not see why it should not, a great deal will have been effected.

From the following figures it will be seen that the increase in the ratio of persons dying in the workhouse to those dying in their own homes over that holding for 1903 is slight. The ratio of persons dying in institutions has decreased.

Ratio of Home Mortality to Mortality in	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904
Union Hospitals...	6·5	6·5	6 2	6·4	6 0	5.2	5·2	5·2	4·8	4 7
Other Public Institutions	11·8	10·9	11·2	11·9	12·6	11·4	9·3	8·3	7·6	8·8

This may be taken to mean that the conditions generally prevailing in 1904 were not worse than in 1903.

But this does not necessarily imply that there was no increase in the actual number of deaths occurring in institutions. The figures are as follows :—

In 1903 there died in Union Hospitals ...	1660	persons
in Other Institutions...	1066	,,
In 1904 there died in Union Hospitals ...	1859	,,
in Other Institutions...	1009	,,

The deaths of Manchester residents occurring during 1904 in various institutions is shown in the following table.

Table 3.—Populations—Deaths of Manchester Residents, 1904, in Public Institutions.

Township	Name of Institution	Census Population, 1901	Deaths, 1903
Ancoats	Ancoats Hospital	90	161
	Workhouse Casual Wards (Tame Street)	185	...
Central	Workhouse Casual Wards	176	4
	Royal Infirmary	274	328
	St. Mary's Hospital	59	24
	Lock Hospital	26	...
	Eye and Ear Hospital	9	7
	Wood Street Mission	18	...
	Chetham Hospital	100	...
	Hardman Street Dispensary	...	1
St. George's ...	Girls' Home (Charter Street)	36	...
Cheetham ...	His Majesty's Prison	1,028	6
	Boys' Refuge	220	...
	Northern Hospital (late Clinical)	50	62
	Jewish Hospital	...	3
Crumpsall ...	Manchester Workhouse	2,767	884
*	Prestwich Workhouse	504	223
Blackley	Manchester and Salford Reformatory	91	1
	Litchford Hall	231	2
Moston	St. Mary's Home	45	1
	St. Joseph's Home	50	...
	St. Bridget's Orphanage	27	1
Newton........	Monsall Hospital	428	157
	Little Sisters of the Poor (Culcheth Hall)	165	13
Clayton	Clayton Hospital	20	9
Ardwick	Industrial School	204	...
	Nicholls Hospital	96	1
Openshaw	Crossley's "Home of Peace"	10	18
Rusholme......	St. Joseph's Girls' School	176	...
	St. Mary's Home	61	...
Chorlton-on-Medlock	St. Joseph's Boys' School	418	...
	Royal Eye Hospital	103	1
	Little Sisters of the Poor (Plymouth Grove)	199	25
	Southern Hospital	28	18
	Cancer Hospital	14	10
	Maternity Home	9	11
	Home for Young Girls	25	...
	Church Army Labour Home	20	...
	Penitentiary	42	...
Hulme	Cavalry Barracks	489	...
	Loretto Convent	81	...
Outside City. *	Withington Workhouse	2,013	749
	Pendlebury Hospital	180	44
	Prestwich Lunatic Asylum	2,614	67
	Styal Cottage Homes	...	2
	St. Joseph's Home, Eccles	...	4
	Infirmary and Robinson Kay Home for Incurables, Bury	...	2
	Infirmary, Stockport	...	1
	York County Hospital	...	1
	Liverpool Royal Southern Hospital	...	1
	Bolton Infirmary	...	1
	County Asylum, Lancaster	...	17
	Sheffield Workhouse	...	1
	His Majesty's Prison, Knutsford	...	1
	Patricroft Workhouse	...	3
	Whitchurch Cottage Hospital	...	1
	Blackpool Victoria Hospital	...	1
	Mauldeth Hospital for Incurables	...	1
	Total Deaths		2,868

* Proportion only.

This table is of interest, as showing in some degree the amount and kind of hospital work going on in the City.

The work done by lying-in hospitals is in its nature so valuable, from the point of view of preventing disease and suffering, that one must hope that an extension will take place in the provision for receiving poor women in labour.

One may also direct attention to the admirable work done by Crossley's Home of Peace in the prevention of infection.

No doubt, much may be done at home in the way of preventing the spread of Phthisis, and it is in the home that the chief work of prevention will, under any circumstances, have to be done. But there is also room for a large extension of preventive work by treatment in hospital.

It is, therefore, matter for congratulation that we have now the opportunity of sending some 20 persons from crowded households to the Crossley Sanatorium in the earlier stages of the disease, while we can, in the absence of Smallpox, isolate about 30 cases at Clayton Hospital.

This should produce a substantial effect in arresting the progress of infection in households.

Deaths in Public Institutions in 1904 amounted to 24·6 per cent. of all deaths, showing a slight decrease as compared with the percentage for 1903. These percentages are, however, considerably in excess of those for previous years.

We may now go on to consider more in detail the mortality statistics for the year.

The principal gains and losses in the death-rate, as compared with the average death-rates of the previous ten years, are shown in the following figures :—

Gains in 1904 per 1000 persons living.

Scarlet Fever	0·07
Influenza	0·05
Diphtheria	0·01
Enteric Fever	0·05
Diarrhœal Diseases	0·06
Ill-defined Fever	0·01
Puerperal Fever	0·02
Phthisis	0·06
Abdominal Tuberculosis	0·04
Other Tuberculosis	0·12
Nervous Diseases	0·15
Pneumonia	0·42
Other Respiratory Diseases	0·08
Total	1 14

Losses in 1904.

Smallpox	0·01
Measles	0·02
Whooping Cough	0·01
Pyæmia and Septicæmia	0·02
Alcoholism	0·02
Cancer	0·08
Premature Birth	0·05
Heart Disease	0·19
Bronchitis	0·03
Digestive Organs	0·01
Old Age	0·08
Total	0·52
Balance of Gain from above Causes	0·62
Do. All Causes	0·98

From these figures we perceive that the annual death-rate is lower than the average annual death-rate for the preceding ten years by nearly 1 per 1000.

The largest gains of the year, as compared with the years 1894-1903, come under Pneumonia, Tuberculosis, and Nervous Diseases, amounting under the three heads to 0·79 per 1000. The chief loss is that under Heart Disease of 0·19 per 1000.

Table 4 is one of considerable interest. The death-rates are here given for the whole City, for each of its main divisions, and for each sanitary district, split up into three parts, the home death-rate, the Union Hospital death-rate, and the death-rate of the persons from the district dying in other institutions.

At this distance of time from the Census we cannot put much confidence in some of the district death-rates, but in the main they are sufficiently near the facts to allow of general conclusions.

Moreover, the relative proportions of the three death-rates are not affected by errors in the populations.

The death-rates occurring in the Union Hospitals are taken as poverty indices, and those occurring in other institutions as comparative indices of poverty.

The usual relations are maintained, except that there is a somewhat higher poverty index for South and North Manchester than usual.

This would indicate an extension of distress and some increase in pauperism during the year 1904.

Table 4.—1904.—Death-rates * in the Homes of the People, in Workhouses, and in Hospitals for the various Divisions of the City.

Statistical Divisions	Estimated Populations ‡	Death-rate per 1000 of persons dying in their own homes	Death-rate per 1000 of persons dying in Workhouses	Death-rate per 1000 of persons dying in Hospitals	Total death-rate per 1000	Mean death-rate 1881-1900
City of Manchester. ...	558,335	15·76	3·34	1·79	20·89	23·28
I. Manchester Township..	130,742	17·31	6·78	2·65	26·75	30·04
II. Northern Districts	177,056	14·24	1·29	1·60	17·12	18·31
III. Southern Districts	250,537	16·02	3·00	1·48	20·51	22·24
I. Ancoats	44,141	17·26	5·30	3·22	25·78	30·37
I. Central	27,787	17·17	9·82	2·48	29·47	30·98
I. St. George's	58,814	17·41	6·46	2·31	26·18	29·46
II. Cheetham	39,531	9·87	1·34	2·05	13·26	14·50
II. Crumpsall	9,139	12·36	1·31	1·09	14·77	15·48
II. Blackley	9,311	13·64	1·50	1·29	16·43	17·95
II. Harpurhey	18,825	14·87	0·80	1·27	16·95	19·01
II. Moston	15,389	12·93	0·72	0·97	14·62	14·11
II. Newton Heath	37,552	15·90	1·49	1·65	19·04	19·55
II. Bradford	24,553	18·29	1·67	1·59	21·55	23·36
II. Beswick	12,123	18·81	1·81	2·39	23·01	20·30
II. Clayton	10,633	12·98	0·38	1·03	14·39	17·18
III. Ardwick	43,192	15·70	2·71	1·64	20·05	21·73
III. Openshaw	28,146	17·87	1·71	1·35	20·93	21·67
III. West Gorton	30,738	14·05	2·11	1·24	17·41	21·52
III. Rusholme and Kirk ...	25,886	13·95	1·08	0·93	15·95	16·05
III. Chorlton-on-Medlock ..	57,093	14·31	4·13	1·59	20·04	21·34
III. Hulme	65,482	18·68	3·93	1·68	24·28	25·42

* In this table, *every death* occurring in a Public Institution has been referred to the District from which the patient originally came.

‡ Population estimated to middle of 1904.

The highest home death-rates occurred in Hulme in South Manchester, and in Bradford in North Manchester. An examination of the home death-rates shows that, were the differences in social conditions removed, there would not be so great a difference between the death-rates in the three divisions of the City.

Death-rates at Different Periods of Life.

The death-rates at all ages and at six periods of life are shown in the following tables for the last 14 years:—

Corrected Populations in Age Groups, 1891–1904.

Year	All ages	Under 5 years	5-15 years	15-25 years	25-45 years	45-65 years	65 years and upwards
1891	508,673	63,760	113,489	102,776	147,386	68,258	13,004
1892	512,135	63,776	113,289	103,682	149,087	69,040	13,261
1893	515,835	63,822	113,142	104,637	150,857	69,854	13 523
1894	519,561	63,871	113,001	105,596	152,635	70,671	13,787
1895	523,314	63,924	112,866	106,561	154,420	71,492	14,051
1896	527,094	63,980	112,736	107,532	156,214	72,316	14,316
1897	530,901	64,039	112,613	108,508	158,015	73,144	14,582
1898	534,736	64,101	112,495	109,490	159,825	73,977	14,848
1899	538,599	64,167	112,385	110,477	161,642	74,813	15,115
1900	542,490	64,236	112,276	111,471	163,471	75,653	15,383
1901	546,408	64,308	112,175	112,470	165,306	76,497	15,652
1902	550,355	64,773	112,985	113,283	166,501	77,049	15,764
1903	554,331	65,256	113,838	114,109	167,689	77,550	15,889
1904	558,335	65,752	114,714	114,953	168,893	78,037	15,986

Corrected Death-rates in Age Groups, 1891–1904.

Year	All causes	Under 5 years	5-14 years	15-24 years	25-44 years	45-64 years	65 years and upwards
1891	25·97	86·6	4·80	5·65	13·93	40·4	134·2
1892	23·22	78·7	4·59	5·37	12·06	35·9	114·4
1893	24·35	86·3	4·73	4·94	12·51	35·3	121·7
1894	19·93	66·5	3·97	4·52	11·16	29·5	100·9
1895	24·68	90·7	4·67	5·19	11·92	35·9	116·0
1896	22·53	80·4	4·08	4·89	11·22	33·3	110·9
1897	22·58	85·3	3·94	4·54	10·24	32·4	109·9
1898	21·49	78·1	3·55	4·14	10·80	32·0	104·1
1899	24·22	87·5	4·22	4·86	11·80	36·4	118·6
1900	23·79	78·3	4·21	4·63	12·52	39·7	119·4
1901	21·60	74·5	4·44	4·40	10·48	34·2	106·0
1902	20·03	64·7	4·12	4·39	10·26	33·8	99·2
1903	19·45	69·5	3·71	4·05	8·99	29·7	97·5
1904	20·89	75·8	3·71	4·15	9·40	31·3	105·5

It will be seen that the lowered death-rates for 1902 and 1903, at ages 0–5, are not maintained. At school ages, however, the improvement shown in 1903 is fully kept up. At the subsequent age periods the great improvement shown in 1903 is not sustained, but all through the later periods of life, except at ages above 65, the death-rates in 1904, although higher than those in 1903, are lower than the death-rates at the corresponding age periods in previous years. A glance at the table will show the general improvement which has occurred since 1891 at all age groups.

It is in fact the increased death-rate in infancy and childhood which has raised the death-rate in 1904 to 21 per 1000.

It is gratifying to find that such is the case, since the causes of death in the early years of life are more accessible to the operations of the Public Health Department than are those of later years.

Influence of Sex on Mortality.

From Table 5, again, we are able to compare the relative mortality at all ages, and also at 12 age groups, in males and females.

As in 1903 the difference in mortality between males and females is over one-seventh of the total death-rate.

In 1903 the male death-rate exceeds the female at every age group except at the ages 10–14.

In 1904 the male death-rate exceeds the female at every age group except at ages 5–9.

At these ages the mortalities are small, and comparatively small causes may turn the scale.

At ages 0–4, and also at ages above 20, however, the differences are marked.

They are especially wide at ages 25–34, 35–44, 45–54, and 55–64, and indicate fundamental differences of social conditions or habits, or both, at those ages.

Partly it is due to more strenuous work on the part of the males; partly to more dissipation; partly, also, it is due to the considerable number of unmarried male labourers living under unfavourable conditions.

The causes of death (Tables B and C) will show under what headings the differences occur.

TABLE 5.—ANNUAL RATES OF MORTALITY IN MANCHESTER IN THE YEAR 1904, AT TWELVE GROUPS OF AGES AMONGST PERSONS—MALES AND FEMALES.

GROUPS OF AGES	PERSONS			MALES			FEMALES		
	Estimated Population	Deaths	Death-rates	Estimated Population	Deaths	Death-rates	Estimated Population	Deaths	Death-rates
All Ages	558,335	11,666	20·89	270,275	6,102	22·58	288,060	5,564	19·32
0 —	65,752	4,981	75·75	32,721	2,669	81·57	33,031	2,312	69·99
5 —	58,561	281	4·80	29,064	136	4·68	29,497	145	4·92
10 —	56,153	144	2·56	28,159	78	2·77	27,994	66	2·36
15 —	56,051	203	3·62	27,193	109	4·01	28,858	94	3·26
20 —	58,902	274	4·65	27,720	145	5·23	31,182	129	4·14
25 —	98,033	649	6·62	47,326	365	7·71	50,707	284	5·60
35 —	70,860	939	13·25	34,769	517	14·87	36,091	422	11·69
45 —	49,080	1,074	21·88	23,667	596	25·18	25,413	478	18·81
55 —	28,957	1,371	47·34	13,198	706	53·49	15,759	665	42·20
65 —	12,512	1,135	90·71	5,207	535	102·75	7,305	600	82·14
75 —	3,243	530	163·43	1,181	213	180·36	2,062	317	153·73
85 +	231	85	367·97	70	33	471·43	161	52	322·98

From these we find that in 1903 the numbers of deaths from Phthisis were—of males, 643; females, 382; Pneumonia—of males, 605; females, 429.

On the other hand, the deaths from Cancer were—of males, 185; females, 239; from Bronchitis—of males, 485; females, 549.

There are a number of minor causes in respect of which the deaths of males exceed those of females, but by far the most important certified cause is Phthisis, and next to that Pneumonia.

Precisely the same remarks apply to the year 1904.

In that year the deaths from Phthisis numbered—of males, 691; of females, 415; from Pneumonia—of males, 611; of females, 490.

From Cancer the deaths were—of males, 192; of females, 260; from Bronchitis—of males, 572; of females, 644.

It cannot be doubted that the large number of persons who inhabit or come to our common lodging-houses when ill, and who swell so largely the list of Phthisis deaths, help to make the difference between the male and female mortality.

The difference is, however, to no small extent caused by the greater susceptibility of the male to fatal illness. Thus there were in 1903 and 1904:—

Deaths from	Males		Females	
	1903	1904	1903	1904
Enteric Fever	63	38	30	28
Alcoholism	39	51	18	26
Premature Birth	196	218	171	155
Convulsions	116	103	82	87
Urinary System	146	160	107	120
Marasmus and Atrophy	339	346	281	274
Violence	188	212	144	135

It is notable, under convulsions and wasting diseases, how a female child will struggle through conditions of nutrition which are fatal to the male.

Causes of Death.

These we have already briefly considered for all ages and both sexes. More precise information, however, is given under Tables E, F, and K.

Table E gives the death-rate per 1,000 living at all ages, from a number of infectious diseases, over a long series of years.

These figures may be used for a comparison between one year and another in one place, whether Manchester or elsewhere, subject to corrections for population, but are strictly not usable without further corrections in a comparison of different towns.

We perceive that from Scarlet Fever, Enteric Fever, and Diarrhœa there has been a decided improvement in recent years.

From Diphtheria the death-rate of recent years had increased, though in 1904 there are signs of a decline.

Smallpox has shown signs of revival during the last three years.

We have seen reason, in former reports, to believe that Scarlet Fever may be propagated by fæcal deposits. This suggestion was founded on the close association of untraced cases with insanitary closets, and on the presence of green Diarrhœa, Enteritis, enlarged Pyer's patches, and enlarged mesenteric glands in certain severe forms. If this be so, the conditions governing the propagation of Enteric Fever, Scarlet Fever, and Diarrhœa would appear from the statistics to have no necessary relationship to each other.

From Tables F and K we see that the death-rate from Phthisis has diminished during the last two years, although last year it nearly reached 2 per 1,000.

It is, however, impossible to be so precise about any disease as to measure variations in its mortality in parts per 10,000.

The number of tubercular deaths which can be, and are, included under such terms as Bronchitis render such fine measurements quite inapplicable.

The tendency of the last two years, as shown by figures, was towards a diminution. But Phthisis is a disease eminently dependent on distress and overcrowding, and it is to be feared that for the next two or three years there will be an increase.

If, however, alcoholism is, in reality, declining, the improvement from that cause may counterbalance the havoc caused by distress and overcrowding,

A still further improvement is shown under the titles "Other Tubercular Disease" and "Tabes Mesenterica."

Notwithstanding the unsatisfactory character of the terms employed, and the uncertainty of diagnosis involved in the words "Tabes Mesenterica," there is little doubt that a substantial improvement has occurred in forms of Tuberculosis other than Phthisis during the last ten years.

Nervous Diseases show improvement under various headings, the chief gain being under Insanity, a cause of death under which we have been but little accustomed to find a lowered mortality. There is also improvement under the heading "Inflammation of the Brain."

As against the improvement under the term "Insanity," there is a marked increase of deaths from "General Paralysis of the Insane."

There is, however, an aggregate improvement in the mortality of the insane in 1904.

It may be that part of the decrease under the term "Insanity" is due to increased precision in differentiating General Paralysis of the Insane from other forms of Insanity.

If so, that indicates an advance both in appreciation and treatment highly to be desired.

Under Diseases of the Circulation there is an increase of mortality, giving an excess of 0·2 per 1,000 from this cause over the average for ten years.

If we glance at the mortalities under this heading and under Respiratory Diseases for a number of years we perceive that the death-rates from the two tend to rise and fall together, as we should expect, since a weak heart determines affections of the lungs, and these in turn embarrass a weak heart.

On the other hand the mortality from Respiratory Disease is 0·47 per 1000 lower than the average for the last ten years.

This appears inconsistent, and, in fact, is so. The term 'Respiratory Disease' includes the affections Bronchitis, mainly a disease of advanced years, Broncho-pneumonia, a condition which may be allied to Bronchitis or to Acute Lobar Pneumonia, but may also represent changes incidental to various specific diseases, Acute Lobar Pneumonia itself, a condition which may arise from various specific infections, but which usually is a specific form of inflammation, and the affections grouped as Other Respiratory Disease.

Etiologically, the three chief forms of lung affection own widely different causes.

If, however, we class Lobar and Lobular Pneumonias together, and consider Bronchitis as a separate cause of death, we find that the simultaneous rise and fall of Diseases of the Circulation and of Bronchitis comes out much more distinctly. 'Pneumonia' is an obscuring element.

Referring now to Table K, we see that while there was a slight loss in the mortality from Bronchitis in 1904 over the average for the years 1894–1903, under Pneumonia there was a gain of 0·42 per 1000.

But we have noted that there is liable to be transference from the heading 'Phthisis' to the heading 'Bronchitis.' We may add that the term 'Other Respiratory Disease,' including as it does 'Pleurisy,' will doubtless include a number of cases of Tuberculosis. To a much less extent there may be transference to the headings 'Heart Disease' and 'Pneumonia.' The transference in a reverse direction is doubtless smaller.

Examining the figures for 1904 again in the light of these observations, we perceive on Table K that the slight increase of mortality under Bronchitis might be supposed to diminish the value of the slight improvement under Phthisis, were it not that under the heading 'Other Respiratory Disease' there is an improvement.

No doubt, however, attaches to the marked improvement under Phthisis in the year 1903.

It is to be borne in mind, also, in assessing the value of figures relating to tubercular mortalities that seasonal changes may accelerate death from Phthisis by inducing catarrhal conditions of the lung, and the mortality proper to one year may thus be transferred to the year before, or it may be, under favourable conditions, to the year following.

The mortality from any one year, therefore, should not be taken by itself, and the death-rate from Phthisis must not be considered alone, but always with an eye on the death-rates from Bronchitis, Pneumonia, Other Respiratory Diseases, and Heart Disease.

The last two years together may be taken to show an advance, in spite of the unfavourable social conditions prevailing.

It will be noted that the mortality from Puerperal Fever has undergone an increase in 1904.

Reliance cannot be placed on this or on the figures for previous years.

In future, however, under the arrangements which have been made at the beginning of 1905, it will be difficult for any death which may properly be assigned to Puerperal Fever to escape classification.

From Cancer it will be noted that the death-rate has again gone up. In the absence of special investigation, I am unable to offer any explanation of this circumstance.

It is possible, however, that the tendency observed during the last decade, and favoured by recent death-rates, towards an increase in the proportion of persons living at more advanced ages, may in part explain the increase.

The same circumstance will also serve partly to explain the tendency to an increased mortality from Bronchitis and Heart Disease.

The causes of death to which the various periods of life are most liable.

Childhood.

In Table D we get a detailed account of the causes of death at ages under three months, from 3-5 months, in the last half of the first year of life, and in each of the years of age 1, 2, 3 and 4.

The picture thus offered in no way differs from that presented by the same table in previous years.

From Measles the mortality is heaviest in the second year of life.

This disease is propagated to no slight extent in the infant department of schools. Owing, however, to early intimations from the Educational Authority of the occurrence of cases, it is possible to some extent to impose a check on its spread.

Whooping Cough is most fatal in the second half of the first year of life. It is largely propagated, also, in the infant department of schools.

Diarrhœal disease is most fatal in the second quarter of the first year of life. The causes of the high fatality from this disease are discussed in another section of the report.

It may here be stated, however, that special instruction is called for in respect of the modes of tending and feeding infants.

Tuberculous diseases of infancy. This is probably an entire misnomer. What positive evidence we have shows that fatal tuberculosis is rare in the first months of life, gradually increasing afterwards. This is inconsistent with the statistics of the declared causes of death. These are certainly erroneous.

Convulsions may be put down in large measure to digestive conditions. The great improvement under this heading would seem to indicate improvement in methods of feeding.

Lung diseases are very fatal in the early years of life. They reach their acme in the latter half of the first year of life. Both in its evolution, and in the later stages of life, the lung is peculiarly susceptible to disease,

The high mortality from wasting diseases is again a reproach to our educational methods, and is, or ought to be, largely preventable.

Under the heading "Found dead in bed" are 66 deaths. These are, no doubt, largely due to intemperance in the parents.

Causes of Death at different age periods.

Turning to Table M we obtain a view of the death-rates due to certain specified causes at six groups of ages.

We see that at ages 0-4 the heaviest mortality is exacted by the zymotic group of diseases and by respiratory disease.

Diseases of the digestive system also take a very important share in causing the high fatality in this group.

At school age (5-14), Tubercular Disease is already the most important cause of death, and about 25 per cent. of the deaths comes under this heading. Zymotic Diseases come next in importance.

Respiratory Disease, other than Phthisis, also plays an important part.

At ages 15-24, the deaths from tubercular disease reach the high proportion of 43·4 per cent. of the total number.

At this, and the three following ages, Enteric Fever exacts a substantial tribute, though it may be doubted whether, in reality, these figures are not under the mark.

Next in importance to tubercular disease comes Respiratory Disease, mainly Pneumonia.

At ages 25-44, deaths from Tubercular Disease again form more than one-third of the total number.

Respiratory Disease, chiefly Pneumonia, and Diseases of the Circulation have now become more formidable.

At ages 45 to 64 the death-rate from Tuberculosis has again increased, but Respiratory Disease and Diseases of the Circulation have now become the most fatal.

Bronchitis now ranks far before Pneumonia.

At ages above 65 the chief assigned causes of death are Bronchitis and Heart Disease.

The very high fatality from Pneumonia at the middle periods of life is a distinctive feature of Manchester, and should receive special study. When opportunity offers I hope to make such a study.

Vital Statistics of the Different Sanitary Divisions of the City.

The facts with regard to the birth-rates, death-rates, and natural rates of increase for the whole City, for its three main divisions, and for each of the Sanitary Districts, are given in the following table for the ten years 1891-1900, and in Table G (Appendix) for the year 1904. It will be seen that while the birth-rate and death-rate are both lower in 1904 than for the ten years, the natural rate of increase is not materially altered, the advantage being, however, on the side of 1904.

	Mean Birth-rate, 1891–1900	Mean Death-rate, 1891–1900	Mean Annual Rate of Increase, 1891-1900
City of Manchester	**33·09**	**23·27**	**9·7**
Manchester Township............	35·51	30·10	5·4
North Manchester	32·06	18·30	13·8
South Manchester	32·39	22·32	10·1
Ancoats	37·98	30·25	7·7
Central	30·78	31·01	0·2
St. George's	36·35	29·52	6·8
Cheetham	31·72	14·61	17·1
Crumpsall..........................	24·68	15·19	9·5
Blackley	27·17	18·10	9·1
Harpurhey	35·11	19·20	15·9
Moston	27·30	14·27	13·0
Newton.............................	30·59	19·61	11·0
Bradford	38·19	23·50	14·7
Beswick	37·97	20·29	17·7
Clayton.............................	29·62	17·24	12·4
Ardwick	34·72	21·78	12·9
Openshaw..........................	36·18	21·69	14·5
West Gorton	36·25	21·56	14·7
Rusholme, etc.....................	25·73	16·13	9·6
Chorlton-upon-Medlock	26·99	21·38	5·6
Hulme	34·65	25·48	9·2

It will also be noted that while the birth-rates and death-rates in 1904 are widely different in the three main divisions from the rates of the ten years, the natural rates of increase do not differ by much. There is a gain in the rate of increase of the Township, a loss of half that amount in North Manchester, and no alteration in South Manchester.

As regards birth-rates in the Sanitary Districts, the distribution of high birth-rates is not materially different in 1904 from what it is for the 10 years, and this distribution has been already discussed. It represents in the main an industrial population steadily occupied.

The chief divergence noticeable is one in Harpurhey. The average birth-rate for the 10 years was 35·11; for 1904, 28·3. There has been decline both in the birth and death-rates. This is an area in which there has been a considerable amount of building, and it is probable that the population as a whole is rather better off now than formerly.

In Rusholme exactly the reverse has taken place. Here there have been a large number of cottage houses erected in what was formerly, in the main, a residential district.

Over the 10 years the birth-rate was 25·73. In 1904 it was 30·44 per 1,000.

As regards the death-rates, in the Manchester Township, Ancoats and St. George's have improved relatively to the Central District, and Ancoats in 1904 has a lower death-rate than St. George's.

But the death-rate of the Manchester Township still remains high as compared with that of South Manchester, as does the death-rate of South Manchester compared with that of North Manchester.

By reference to the table already given on page 22 it will be seen that this difference in mortality corresponds roughly with the differences of the "poverty indices," and that, in fact, from whatever cause arising, penury is a potent cause of increased mortality.

In North Manchester, Bradford and Beswick show high death-rates in 1904, while Newton follows at some distance. The lowest death-rate is in Cheetham.

In South Manchester the large and populous district of Hulme approaches Ancoats in its mortality, followed at a considerable distance by Openshaw, Chorlton-on-Medlock, and Ardwick. West Gorton has an unusually low death-rate in 1904.

As regards natural rate of increase, comparatively few districts fail to give a natural rate of increase which would maintain the rate of increase calculated by the Registrar-General for the whole City. These are Ancoats, Central, St. George's, and Chorlton-on-Medlock, over the 10 years. In 1904, however, Crumpsall, in addition, fails to supply the necessary increment, while Ancoats succeeds in doing so.

In the Central District there is an absolute excess of deaths over births, greater in 1904 than in the decade. This is due to the large number of unmarried persons who crowd into common lodging-houses, bringing their maladies with them into Manchester, and pass thence into Crumpsall to die.

The mortality of this class, and in corresponding sections of the population, is frightful.

To no small extent they are not the product of Manchester conditions.

The same observation applies in lesser measure to the other districts which I have named as failing to supply the calculated increment.

Properly speaking, this correction is applicable only to the death-rate of persons dying in their own homes.

It is, of course, a necessary condition of any useful discussion of the causes of death, either for the whole City or for its parts, that a determination as accurate as possible of the diseases causing death should be made. This can only be done if a medical practitioner has attended before death, or has made a post-mortem examination after death.

From Table L we find that 684 deaths were certified by the Coroner, while 219 were not certified at all, making respectively percentages of all deaths equal to 5·9 and 1·9, and a total percentage of 7·8. This proportion, though lower than that for other recent years, is far too high.

It is not possible without careful study of the records of inquests, and of the death certificates, to say what proportion of these are entirely unreliable. But it is assuredly most necessary that, as far as practicable, the cause of death should be exactly ascertained in each individual instance.

It will be noted that the proportion of deaths not certified by a medical practitioner in the usual manner is highest in the Central Districts and in Hulme, districts specially requiring accurate and complete death records.

Table H shows that 4 per cent. of the infants born in the City are illegitimate. These unfortunates die in their first year at a rate considerably more than twice that of legitimate infants, owing, chiefly, no doubt, to the absence of maternal care. In the following districts more than half the illegitimate children perish : Central, Newton Heath, Bradford, Beswick, and West Gorton.

Causes of Death compared in the Three Main Divisions of the City.

Table K gives the deathrate per 1000 of persons living at all ages from a number of causes in each of the three main divisions of the City. It has already been explained how such a comparison may be misleading if the constitutions of these divisions differ as regards the proportion of persons living at different ages, as they do.

We may, however, make allowances for these differences.

Measles, then, was most fatal in South Manchester in 1904, then in the Township, and Whooping Cough was most fatal in the Township.

Diphtheria was most fatal in North Manchester, Enteric Fever in the Township.

Diarrhœa, as usual, was most fatal in the Township, then in South Manchester.

Septic diseases were most fatal in the Township, and more fatal in North than in South Manchester.

Phthisis was far most fatal in the Township, then in South Manchester.

Other tubercular diseases were more fatal in the Township than in South Manchester, and in both were considerably more fatal than in North Manchester.

Alcoholism was by far the most fatal in the Township, though we cannot expect to get a correct or even an approximate account of the deaths due to this cause.

Cancer was most fatal in the Township, and then in South Manchester.

Having regard to the different constitutions of the population, not much account can be taken of this fact. In North Manchester the fatality from Cancer was much lower than in either of the other two divisions.

From the larger causes of death, Heart Disease, Bronchitis, and Pneumonia, the mortality was highest in the Central District, then in South Manchester.

From diseases of the digestive organs the mortality was much the highest in the Township.

For reasons already given, however, it is desirable to compare the deathrates in the three main divisions at different groups of ages.

With every year that passes after the Census the estimated populations get wider of the mark, and those of the constituent parts do not preserve their relative positions. We can rely, therefore, only on large differences in the mortalities.

First, then, we note that at every period of life the Manchester Township has the largest mortality and North Manchester the smallest.

The figures are as follows :—

Death rates in 1904	Manchester Township	South Manchester	North Manchester
At all ages	26·75	20·51	17·12
Deaths of infants under one year of age per 1,000 born	208·09	189·71	165·59
Death rate per 1,000 living under five years of age	94·11	77·11	61·04
Death rate ages 5–14	4·59	3·58	3·26
,, ,, 15–24	5·24	3·88	3·75
,, ,, 25–44	13·15	8·51	7·97
,, ,, 45–64	40·11	30·00	25·81
,, ,, above 65	121·50	111·83	94·90

Wide as are the aggregate discrepancies, we see that they are still wider at the middle periods of life. At the ages 25–44 and 45–64 the Manchester Township has death rates higher than those of North Manchester in a proportion of above four to three.

This is undoubtedly due in part to the common lodging-houses, and to the large number of persons in the Central Districts engaged in what may be called casual labour, or at all events precarious labour.

Referring now to Table J, which gives the death-rates under one year per 1,000 births for the three chief divisions of the City, we see that the excess of mortality in the Township is made up under the headings Diarrhœa, Lung Disease, Wasting Diseases, and "Found dead in bed." It is, in fact, due largely to intemperance, ignorance, neglect, and dirt. This observation, be it observed, applies to the excess in mortality, and not to the total mortality.

Under Measles, Whooping Cough, and Tubercular Diseases, this excess is not found. What, however, is surprising is the fact that the death-rate under the heading "Convulsions" is lower in the Manchester Township than in either of the other two divisions. "Convulsions," as a cause of death, is in great measure due to injudicious feeding, and in former years it has been used as one of the tests of what is being effected by our instructions in infant feeding.

During the past year, however, fresh efforts have been made to give exact and practical instructions through the visitors of the Ladies' Public Health Society, whose operations concern more particularly the Central Districts of the City. It is possible that the death-rates from "Convulsions" indicate that some success has attended these instructions.

Turning now to Table N, we find that at the ages 0–4 the excess in the Township falls under the headings Diarrhœa, Lung Diseases, Diseases of the Digestive System, and unnamed causes. There is also excess under Whooping Cough. Under the other Zymotics, however, there is not excess, and under Tubercular Disease the mortality is lower than in South Manchester, though more than double that in North Manchester.

At school ages 5–14 the chief headings under which the mortality of the Township exceeds are Tubercular Diseases and Lung Disease. A decided difference, though of smaller amount, occurs under Diseases of the Digestive System.

Phthisis has now begun to exact a high mortality, and the influence of malnutrition tells heavily against the children. There is no excess under Zymotics.

At ages 15 to 24 there is a marked excess in the mortality of the Township under Tubercular Disease, which is now the chief cause of death, and under Lung Diseases. Small differences occur under Diseases of the Nervous, Circulatory, Digestive, and Urinary Systems.

Here, again, the influence of malnutrition is evident. The mortality from Phthisis in the Manchester Township at this age period bears to the total mortality the enormous proportion of 43 per cent.

The crowded lodging-houses and the public-houses serve as centres from which this immense volume of tuberculous commerce issues.

At ages 25–44 a still greater excess of tubercular mortality is found in the Township. The death-rate from this cause now exceeds that of North Manchester by more than two to one.

Marked excess also prevails under Diseases of the Respiratory System.

Smaller but decided excesses also occur under Diseases of the Nervous, Circulatory, Digestive, and Urinary Systems. The influence of alcohol has now made itself strongly manifest.

The mortality from Phthisis is still more than one-third of the total mortality in the Manchester Township, while the death-rate is absolutely more than double what it was at the preceding age period.

At ages 45 to 64 we are struck by the great excess of mortality in the Township under Tubercular Disease. There is also, however, marked excess under other forms of Lung Disease.

The death-rate from Phthisis in the Township is nearly four times, and that in South Manchester is over twice, the death-rate in North Manchester.

Heart Disease now reaches a high level in all the main divisions.

Cancer has now become a formidable cause of death. The death-rate is, however, higher in South Manchester than in the Township, though higher in both than in North Manchester.

In this connection it is to be remembered that the mortality from Cancer is greater among women than among men, and that the proportion of women in the Township is decidedly lower than in South Manchester.

Were the proportions the same, the Manchester Township would, no doubt, have the higher mortality from this cause. The preponderance of men in some, but only in a minor degree, explains also the great excess of tubercular and respiratory mortality in the Township.

We are, therefore, not to infer that unfavourable circumstances and habits are without influence on the production of Cancer.

At ages above 65, Diseases of the Circulatory System exact the heaviest mortality. The excess of mortality in the Township is still made up, however, in greatest measure, under the headings Lung Disease and Phthisis.

Phthisis has now become a subordinate cause of death, but it is notable that it is now more than eleven times as fatal in the Township, and more than three times as fatal in South Manchester, as it is in North Manchester.

The conditions of life in the Township serve in fact to produce a constant supply of tubercular infection, which is distributed and retailed in all parts of the City.

Malignant disease has now become a veritable scourge, and its true relations become more evident. The differences in mortality, however, between the Township and South Manchester, and between South and North Manchester, are not very great.

The figures with regard to Phthisis are so remarkable as to inspire some doubt as to their correctness. Is it possible that medical men are still haunted by alarms as regards hinting at tubercular disease to their patients, and that the figures are in this way rendered unreliable? If so, some evidence should be found, under the heading "deaths from Respiratory Disease," that transposition has occurred. It cannot be said that this possibility is entirely excluded by those figures, yet it may, I think, be concluded that they are such as to preclude anything except a very partial transposition.

No one who is at all acquainted with the history of phthisical fatality can doubt that, though Phthisis is greatly dependent for its propagation on personal health, circumstances, and habits, yet, given a sufficient amount of infection and sufficient propinquity, the disease will fasten on the strongest persons and on the best nourished.

If that is so, then no effort should be spared to limit the incidence and infective capacity of the disease, especially in the Central parts of the City.

INFECTIOUS DISEASES.

The diseases included in the Infectious Disease (Notification) Acts, 1889 and 1899, are as follows : Smallpox, Scarlet Fever, Diphtheria, Membranous Croup, Typhus Fever, Enteric or Typhoid Fever, Relapsing Fever, Continued Fever, Puerperal Fever, Erysipelas, and Asiatic Cholera. The following cases were notified in 1904 and in the ten previous years, and the year 1904 is compared with the average of the previous ten years :—

	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	Aver'ge for 10 Years	1904
Smallpox	282	51	1	...	...	2	3	1	27	422	79	134
Scarlet Fever ...	2,230	2,302	2,389	1,790	897	1,467	2,507	2,692	2,282	2,012	2,057	2,063
Diphtheria...... Memb. Croup	512	402	239	150	196	248	337	457	422	620	358	474
Typhus Fever ...	...	...	1	2	...	3	5	39	...	...	5	...
Enteric Fever ...	460	493	513	503	642	381	378	359	378	387	449	325
Relapsing Fever	...	...	...	...	...	...	...	...	...	...	...	...
Puerperal Fever	51	33	25	49	44	35	49	55	47	30	42	42
Erysipelas	...	...	...	...	...	...	177	318	253	291	†104	266
	3,535	3,281	3,168	2,494	1,779	2,136	3,456	3,921	3,409	3,762	3,094	3,304

† Average 4 years.

The number of deaths for eleven years from the more common diseases is shown in the following table, 1904 being compared with the average :—

From	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	Aver'ge for 10 Years	1904
Measles	222	505	567	628	271	699	254	292	242	345	403	425
Scarlet Fever ...	116	173	198	124	65	46	105	127	146	97	120	85
Diphtheria...... Memb. Croup	149	113	83	46	51	85	101	133	123	136	102	99
Enteric Fever ...	91	95	118	95	120	73	75	75	66	93	90	66
Smallpox	21	2	...	...	...	...	...	...	...	24	5	9
Influenza	45	194	53	107	64	219	239	99	80	62	116	97
Whooping Cough	286	250	359	299	170	227	371	224	242	213	264	280
	930	1,332	1,378	1,299	741	1,349	1,145	950	899	970	1,100	1,061

SMALLPOX.

I beg to submit a report on the prevalence and spread of Smallpox in the City during 1904, and also to report on cases treated in Clayton Vale Hospital during the year.

Dr. Cowie reports that during the first quarter of 1903, at which period in the present epidemic Smallpox was most prevalent, the majority of cases occurred in common lodging-houses, or were directly traceable to tramps.

During the second quarter 10 out of 128 cases were tramps. During the the third and fourth quarters only two tramps suffering from Smallpox were reported out of 57 cases.

During the first quarter of 1904, 34 cases were reported. Ten of those cases were tramps or hawkers, including an organ-grinder. Of these 10, four were inmates of common lodging-houses, two of public institutions, four of private houses. Seven cases were traceable, directly and indirectly, to two of those tramps, who lived at private houses, and none to the others.

In the second quarter 42 cases were notified; five were tramps and five were organ-grinders. From the three tramps removed from common lodging-houses only two cases arose. One of the organ-grinders gave rise to four cases.

Of 35 cases notified in the third quarter, only four belonged to the tramp and hawker class. Six cases are attributable to one of the three tramps removed from private addresses. The lodging-house tramp gave rise to no further cases.

Of the 25 cases arising in the last quarter none were tramps.

From what has been stated, it is evident (1) that the percentage of tramps to the total number of patients was greatest in the first quarters of both years and decreased progressively each quarter, and (2) that the disease did not spread readily in the Manchester common lodging-houses during 1904.

The following table shows the attacks in weeks:—

Table I.—Smallpox Attacks in weeks reported in 1904, according to date of onset.

First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Jan. 9	...	April 9	1	July 9	1	Oct. 8	...
,, 16	1	,, 16	4	,, 16	1	,, 15	2
,, 23	3	,, 23	4	,, 23	...	,, 22	2
,, 30	...	,, 30	1	,, 30	4	,, 29	3
Feb. 6	3	May 7	...	Aug. 6	1	Nov. 5	1
,, 13	1	,, 14	3	,, 13	5	,, 12	3
,, 20	2	,, 21	3	,, 20	2	,, 19	5
,, 27	...	,, 28	4	,, 27	1	,, 26	1
Mch. 5	1	June 4	5	Sept. 3	1	Dec. 3	...
,, 12	5	,, 11	7	,, 10	8	,, 10	1
,, 19	5	,, 18	2	,, 17	5	,, 17	...
,, 26	8	,, 25	2	,, 24	2	,, 24	...
April 2	8	July 2	1	Oct. 1	9	,, 31	2
Total...	37	Total...	37	Total...	40	Total...	20

City Total 134

The following table gives the number of cases in each district, the attack rate per 1000, and the case fatality per cent. :—

TABLE II.

DISTRICTS	ATTACKS	ATTACK RATE PER 1000	CASE FATALITY PER CENT.
Ancoats	22	0·50	...
Central	13	0·47	15·4
St. George's	14	0·24	...
Cheetham	4	0·10	25·0
Crumpsall	2	0·22	...
Blackley	5	0·54	...
Harpurhey	1	0·05	...
Moston	...	...	...
Newton Heath	10	0·27	10·0
Bradford	9	0·37	...
Beswick	7	0·58	14·3
Clayton	7	0·66	14·3
Ardwick	6	0·14	16·7
Openshaw	12	0·43	...
Gorton (West)	5	0·16	20·0
Rusholme and Kirk	10	0·39	...
Chorlton-upon-Medlock	1	0·02	...
Hulme	6	0·09	...
City of Manchester	**134**	**0·24**	**6·7**

A clear impression of how the disease was spread can be gained by a study of Table III.

TABLE III.

No. of Infecting Case with Occupation	Nos. of Infected Cases	Relation infected to infecting case and remarks
Fireman, 4	5, 6	Fireman, infected a man at the works, his wife, and a lodger
Warehouseman, Outside Case, *O.C.	9	Fellow worker
Housework, Wife, O.C.	11	Husband
Excavator, *11	20, 21	Daughter and son
Foundryman, 24 O.C.	14, 25	14 was a schoolgirl who lived near the foundry in which 24 worked, 25 was 24's wife
Housework, *25 O.C.	31, 23, 26, 28, 30	23 acted as nurse, 31 was 23's husband, 30 was 31's son, 26 was 25's mother, 28 a neighbour
Schoolgirl, *14	27	Father
Hawker, 32 O.C.	16, 19, 29, 33	Sons and daughters
Rubber Cutter, 37 O.C.	38, 36	Wife and brother
Tramp, 10	40	Sister
Housework, *40 O.C.	41, 42	Daughter and husband
Outside Case, O.C.	65	Sweetheart's brother
Iron Labourer (Out of Work), 44 O.C.	43, 45, 46	43 waiter in bar, frequented by 44, 45 and 46 were his son and daughter
Rubber Cutter, *36	48	Lived next door, no history of contact
Housework, *49	54, 55, 75A	Husband, sister-in-law, fellow-worker of husband's
Organ Grinder, 53	60, 62, 63, 66	60 brother, 62, 63, and 66 lived in lodging-houses frequented by 53
Moulder, *57 O.C.	58, 59	Mother and sister
Tramp, 52	64, 67	2 fellow-lodgers in common lodging-house
Tin Plate Worker, *75A, O.C.	71, 72	2 fellow-workers
Salford Case*	75	Workfellow
Hawker, 80	84, 86, 87, 96†	Out-patient at same hospital, also 2 sisters
Tailor, Stockport Case, O.C.	92	Worker at shop at which he called
Baby, 88	93, 94, 98, 100, 101, 103, 104	Mother, father, uncle, 3 neighbours, grandmother, 88 was an unvaccinated baby notified on the 9th day of the rash as doubtful chicken-pox
Canal Labourer, 90 O.C.	89, 91	Lodger and wife
Housework, *96 O.C.	95, 97	Daughter, husband
Shopkeeper, O.C.	124, 125	2 daughters
At Home, 105	112	Mother
Housework, 106	136	Her baby

TABLE III.—*Continued.*

No. of Infecting Case with Occupation	Nos. of Infected Cases	Relation infected to infecting case and remarks
Housework, 137 O.C.	107, 108, 110	2 children and lodger
Housework, *103	111	Neighbour
Housework, *111	113	Neighbour
School Teacher, O.C.	114, 115	2 fellow teachers
School Teacher, *115	117, 118	Mother and sister
Housework, 121	120, 122	Sister and son
Baby, *122 O.C.	126	Sister
Schoolgirl, *120 O.C.	127, 128, 129, 132	Brother, lodger, shopkeeper, and neighbour
Housewife, *126	131	Her baby
Moulder, O.C.	49, 57	Sister and fellow-worker
Housework, *38	39	Her baby

These 82 cases were in all probability infected as indicated above.
* Indicates that the case has a known source.
† 96 indirectly through overlooked case, an outpatient (96's son).
O.C. indicates an overlooked case.

From this table one finds that—

(*a*) The presence of the disease in common lodging-houses is responsible for only six cases.

(*b*) Tramps, so far as we know, did not spread the disease in Manchester to any extent. Eight tramps, two organ grinders, and one hawker, however, were infected outside Manchester, and later developed the disease in the city. Only two other cases were certainly infected outside Manchester, and one case was infected by one outside case working in Manchester. The tramp, therefore, remains the great importer of Smallpox. The great proportion of tramps have been vaccinated in recent years, and this I believe to be the reason that tramps and common lodging-houses, usually the most potent factors in the spread of Smallpox, have temporarily become much less effective agents. So small was the fear of spread in common lodging-houses that night inspectors were on duty for only seven weeks during last year.

(*c*) In a public-house a barman was infected.

(*d*) Fellow-workers were infected in many instances. The most interesting case was that of a tinplate worker, whose wife took the disease. This man continued to sleep with his wife until her removal to the hospital on the fourth day of the eruption. During this time he carried the infection to a fellow-worker, although his works, to which he walked, were at least a mile distant from his home.

The same methods in the prevention of spread of the disease as were used in 1903 have been followed in 1904. If any medical practitioner reports a case of Smallpox, or a case with a suspicious rash, it is at once visited from the Public Health Office. In nearly all cases a diagnosis is made, and in every case of Smallpox the contacts are urged to be revaccinated, and are kept under observation. There is, therefore, no reason why Smallpox cases should not be removed to hospital on the first or second day of appearance of the eruption if a medical man is in attendance.

Overlooked Cases.

Twenty cases remained outside hospital during their whole illness. In these the illness was—1 (*a*) so mild that the patient did not suspect that he had the disease, or if so (*b*) concealed the fact; (2) the doctor in attendance failed to diagnose the disease

1 *a* and *b*—and I believe chiefly 1 *a*—include nine cases, to which 28 subsequent cases were traced.

2. Includes eight cases, to which 21 cases were traced.

[In three cases, to which six cases were traced, it was not ascertained whether or not a doctor was in attendance. One of these had left town, and two were outside cases.]

With 1 (*a* and *b*) it is almost hopeless to try to deal. With regard to 2 it does seem extraordinary that doctors should not, at least, be suspicious of the nature of mild cases of Smallpox. What deceives most frequently is that the patient may have very slight symptoms at the onset, and feel well, and have no temperature during the whole of the subsequent course of illness.

Apart from complete failure to report, doctors, although suspicious, frequently wait for a few days before coming to a diagnosis. Several cases were due to this delay, vaccination having been carried out too late to prevent subsequent attack. The fact does not seem to have been grasped by many members of the medical profession that if persons are vaccinated later than the third day after contact with Smallpox there is no certainty that they will not be attacked.

The effect of the hospital as a source of infection was probably nil, although one case might have been supposed possibly to have been infected from it, were it not for the occurrence (*c*). Case 106, whose house is situated about 300 yards from the hospital, took ill on the 15th of September, and was discovered accidentally on the 22nd of September. The rash was said to be two days, although it appeared at least four days, old.

Possible sources of infection.—(*a*) Aërial infection. This patient used to walk out daily with her baby, and pass along the outside of the hospital wall. On September 3rd three cases, and on September 10th eight cases, were in hospital. Three recent cases were admitted on the 3rd, 5th, and 6th of September. Only on one occasion during 1904 was a patient found insufficiently oiled. This occurred on the 7th of September. (*b*) There is a history of contact with an unreported case resembling Smallpox on the 31st of August at a seaside resort. (*c*) Relations of this woman kept a beerhouse about three-quarters of a mile from the hospital. A girl, aged 14, who lived near this beerhouse, developed the Smallpox rash on the 19th of September. This points strongly to some overlooked case having caused both illnesses.

Cases discovered by the Staff.—In 1903, 152 (over one-third of the cases) and in 1904, 50 out of 137 cases were discovered by the Public Health Officials. Such a statement gives an idea of the amount of control exercised and the amount of work done in the prevention of the spread of the disease.

Tables III., A, B, and C, give the trades of (A) 35 untraced cases infected in Manchester, (B) r4 cases infected outside Manchester, (C) 6 cases where it is uncertain whether or not the case was infected in Manchester.

TABLE IIIA.

Untraced Cases	Occupation	Untraced Cases	Occupation
1	Architect	82	Charwoman—Hawker
2	House	83	Housework
4	Engine Tenter	99	Hawker
7	Shop Assistant	102	Porter
22	Organ Grinder	105	Housework
24	Foundryman	137	Housework
34	Umbrella	119	Charwoman
35	Wireman	130	Iron Turner
37	Rubber Cutter	133	Medical Student
61	Corset Maker	135	Fireman
68	Blacksmith's Striker	116	Housework
69	Tram Guard	70	Shopkeeper
73	Newspaper Seller	3	Hawker
74	Tramp	32	Hawker
77	Hawker	88	Baby
78	Labourer	121	Housework
79	Mechanic	137	Housework
81	Lurryman		

The above cases were untraced although infected in Manchester,

TABLE IIIb.

Untraced Cases	Occupation	Untraced Cases	Occupation
10	Tramp	52	Tramp
12	Tramp	53	Organ Grinder
13	Tramp	56	Tramp
15	Tramp	76	Moulder
17	Tramp	80	Hawker
47	Tramp	85	Schoolgirl
51	Organ Grinder	65	Traveller

The above cases were infected outside Manchester.

TABLE IIIc.

Untraced Cases	Occupation	Untraced Cases	Occupation
8	Bricklayer's Labourer	90	Canal Labourer
18	Tramp	44	Iron Worker, out of work
50	Tramp	106	Housework
134	Mechanic		

It is doubtful whether or not the above cases were infected in Manchester.

Dr. Ritchie, the Medical Officer to the Education Authority, at the request of the Medical Officer of Health, examined the children attending the undernoted schools in respect of vaccination, with the following results :—

Name of School	Depart-ment	Average Number Attending, or Number Examined*	Unvac-cinated	One Bad Mark	Percentages		
					Unvac-cinated	One Bad Mark	1 Mark
Upper Jackson Street......	Boys	544	32	43	5·9	7·9	Higher Standards 40% Lower Standards 60%
St. Silas	Girls	336	28	16	8·3	4·8	40%
	Mixed	333	52	20	15·6	6·0	
	Infants	98	25	6	25·5	1·0	
St. Philips	Boys	167*	8	28	4·8	16·7	} 10%
	Girls	301*	13	22	4·3	7·3	
	Infants	219*	30	28	13·7	12·8	30-40%
Monmouth Street	Mixed	208	34	1	16·3	0·5	...
	Infants	113	31	...	27 4	...	...
Holy Trinity	Mixed and Infants	380	35	?	9 2	?	...
Jews	......	617*	...	55	...	8·9	...
Totals	......	3,316	288	219	8·7	7·5	...
Totals 1903 and 1904 .	......	7 409	1,001	...	13·4	...	...

Two things are demonstrated by these Tables—

(*a*) That a large percentage of school children, and this applies especially to the Infant Departments, are unvaccinated.

(*b*) That in a large percentage, although vaccination has been successful, it is not sufficient. That one mark is insufficient will be demonstrated in the part of the report dealing with vaccination.

Statement (*a*) shows the inefficient way in which the present vaccination Act is carried out. Statement (*b*) shows the inefficiency of the present Act.

The subject (*b*) is further discussed on pages 47 and 48.

VACCINATION.

The effect of vaccination in modifying the severity of Smallpox was considered very fully in the Annual Report, 1903. 375 cases were dealt with in that year by Dr. Cowie. In order that more certainty may attach to the conclusions arrived at, I have added this year's figures to those of last year. 514 cases are classified according to the severity of the disease, and also according to the area and number of vaccination marks. The cases in which vaccination was successful only after infection are placed in separate tables from the 514 cases above. A change was made in the classification of sub-hæmorrhagic cases. These are not included with the hæmorrhagic cases proper, but are classed according as they were confluent or semi-confluent.

The notable points in Table IX., which includes vaccinated cases only, are :—

1. There are no deaths amongst 22 cases under 15.

2. There is only one death in 106 cases under 25.

3. The fatality percentage rises the older the patients become, or in other words the remoter the vaccination the severer the attack, and the greater the mortality per cent.

Table X., which deals with unvaccinated cases, shows :—

1. A fairly constant large fatality per cent. from 0–24, with a great increase after 25.

The greatest contrast between the tables of vaccinated and unvaccinated is in the fatality percentages, that for the vaccinated being 4, for the unvaccinated 19·2.

TABLE VIII.—SHOWING, AGE, SEX, FATALITY, AND VACCINATION OF SMALLPOX CASES FOR 1903 AND 1904.

Age	Vaccinated			Unvaccinated			Vaccination Doubtful			Cases Vaccinated successfully only after Infection			TOTAL		
	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.
0–4	...	...	...	13	2	15·4	4	...	...	5	1	20·0	22	3	...
5–14	26	...	...	16	2	12·5	5	...	...	2	...	...	49	2	...
15–24	91	1	1·1	13	2	15·4	5	1	20·0	3	...	...	112	4	...
25–44	264	6	2·3	9	3	33·3	10	2	20·0	1	...	...	284	11	...
45–64	86	9	10·5	1	1	100·0	6	1	16·6	1	...	...	94	11	...
65+	5	1	20·0	...	...	...	5	2	40·0	...	...	...	10	3	...
All Ages { M. ...	320	10	3·1	29	8	27·6	24	5	20·8	9	1	11·1	382	24	6·3
All Ages { F. ...	152	7	4·6	23	2	8·7	11	1	9·1	3	1	33·3	189	11	5·8
Total......	472	17	3·6	52	10	19·2	35	6	17·1	12	2	16·6	571	35	6·1

TABLES :—Showing Age, Number of Deaths, and Fatality per cent. of Smallpox Cases, according to Severity of Attack.

TABLE IX.—(1) VACCINATED CASES.

AGE-GROUPS	0—4			5—14			15—24			25—44			45 and upwards			TOTALS		
Character of Attack	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.
Discrete	...	...	...	22	...	...	78	...	...	208	...	...	65	...	...	373	...	...
Semiconfluent.........	...	...	...	...	...	...	4	...	...	20	...	...	8	2	25·0	32	2	6·1
Confluent	...	...	...	...	...	...	1	...	...	9	5	55·5	7	5	71·4	17	10	58·8
Hæmorrhagic	...	...	...	...	...	...	1	1	100·0	2	2	100·0	2	2	100·0	5	5	100·0
All cases..............	...	...	...	22	...	...	84	1	1·2	239	7	2·9	82	9	10·0	427	17	4·0

TABLE X.—(2) UNVACCINATED CASES.

AGE-GROUPS	0—4			5—14			15—24			25—44			45 and upwards			TOTALS		
Character of Attack	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.
Discrete	8	...	...	11	...	...	5	...	...	5	...	...	...	...	...	29	...	...
Semiconfluent	3	...	...	2	...	...	4	...	...	...	...	...	...	...	...	9	...	...
Confluent	2	2	100·0	2	1	50·0	4	2	50·0	4	3	75·0	1	1	100·0	13	9	...
Hæmorrhagic.........	...	...	...	1	1	100·0	...	...	...	...	...	...	...	...	...	1	1	...
All Cases	13	2	15·4	16	2	12·5	13	2	15·4	9	3	33·3	1	1	100·0	52	10	19·2

TABLE XI.—(3) CASES WITH DOUBTFUL VACCINATION.

Age-Groups	0—4			5—14			15—24			25—44			45 and upwards			Totals		
Character of Attack	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.
Discrete	3	...	...	5	...	...	3	...	...	7	...	...	8	...	...	26	...	...
Semiconfluent.........	1	...	...	...	...	...	1	...	...	1	..	...	1	1	100·0	4	1	25·0
Confluent	...	...	...	...	...	...	...	...	...	2	2	100·0	2	2	100·0	4	4	100·0
Hæmorrhagic.........	...	...	...	...	...	...	1	1	100·0	...	...	...	...	...	...	1	1	100·0
All Cases..............	4	...	...	5	...	...	5	1	20·0	10	2	20·0	11	3	27·3	35	6	17·1

TABLE XII.—(4) CASES VACCINATED SUCCESSFULLY ONLY AFTER INFECTION.

Age-Groups	0—4			5—14			15—24			25—44			45 and upwards			Totals		
Character of Attack	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.	No. of Cases	No of Deaths	Fatality per cent.	No. of Cases	No. of Deaths	Fatality per cent.
Discrete	5	2	40·0	2	...	...	3	...	...	1	...	...	1	...	...	12	2	16·6

The following table gives the particulars of 10 cases of Smallpox, from outside districts, which were treated in Clayton Hospital, and have been included in the preceding Vaccination Tables :—

				Vaccination.		
				No. of Marks	Area in sq. inches	Age at Vaccination
F.	26	Heaton Chapel	discrete (mild)	4	1″	infancy
F.	34	Heaton Norris	discrete (mild)	2	$\frac{3}{4}$″	infancy
F.	13	Heaton Moor	discrete	4	1″	infancy
M.	60	Withington	discrete	doubtful vaccination		
M.	20	Moss Side	discrete (mild)	2	$\frac{3}{4}$″	infancy
M.	46	Withington	discrete (severe)	3	$\frac{1}{2}$″	infancy
F.	60	Withington	discrete (mild)	2	$\frac{1}{16}$″	infancy
M.	27	Moss Side	discrete	4	$1\frac{7}{8}$″	infancy
F.	26	Heaton Chapel	semi-confluent	3	$1\frac{3}{4}$″	infancy
F.	43	Moss Side	discrete, extremely mild	2	$\frac{3}{4}$″	infancy

Age Incidence in Vaccinated and Unvaccinated Cases.

Age—Groups	0—4	5—14	15—24	25—44	44†	Total Number
Percentage population living at the various age periods	12	21	21	30	17	554,000
Percentage of affected vaccinated persons at different ages.....................	...	5	20	56	19	427
Percentage of affected unvaccinated persons at different ages	25	31	25	17	2	52

This table shows well the effect of vaccination on the age incidence of Smallpox, and exhibits clearly the high degree of protection enjoyed by vaccinated children.

Number of Marks and their Area.

XIII. to XXa. inclusive.

Tables have been prepared to show the area and number of marks in relation to the variety of case, the age and numbers of deaths (denoted by a star) being given.

Tables showing the relationship of the severity of the disease to the number of primary vaccination marks :—

TABLE XIII.—(1) DISCRETE ATTACKS: NUMBER OF CASES.
No deaths occurred.

Age-Groups	0-4	5-14	15-24	25-44	45 +	TOTALS
Unvaccinated	8	11	5	5	...	29
Vaccination doubtful	3	5	3	7	8	26
1 mark	...	4	5	25	19	53
2 marks	...	4	22	70	32	128
3 marks	...	4	25	63	12	104
4 marks	...	10	25	48	2	85
Over 4 marks	...	...	1	2	...	3
Totals	11	38	86	220	73	428

TABLE XIV.—(2) SEMICONFLUENT ATTACKS.
* = A Death.

Age-Groups	0-4	5-14	15-24	25-44	45+	TOTALS
Unvaccinated	3	2	4	...	...	9
Vaccination doubtful	1	...	1	1	* 1	* 4
1 mark	...	...	...	2	* 3	* 5
2 marks	...	...	3	5	3	11
3 marks	...	...	...	5	1	6
4 marks	...	...	1	6	* 1	* 8
Over 4 marks	...	...	...	2	...	2
Totals	4	2	9	21	* * * 9	* * * 45

TABLE XV.—(3) CONFLUENT ATTACKS.

* = A Death.

Age-Groups	0–4	5–14	15–24	25–44	45+	TOTALS
Unvaccinated	** 2	* 2	* 4	*** 4	* I	********* 13
Vaccination doubtful	...	...	...	** 2	** 2	**** 4
I mark	...	...	...	* I	** 3	*** 4
2 marks	...	...	...	** 4	* 2	*** 6
3 marks	...	...	...	* 3	** 2	*** 5
4 marks	...	...	I	...	...	I
Over 4 marks	...	...	...	I	...	I
Totals	** 2	* 2	** 5	********* 15	******** 10	********************** 34

TABLE XVI.—(4) HÆMORRHAGIC ATTACKS.

* = A Death.

Age-Groups	0–4	5–14	15–24	25–44	45+	TOTALS
Unvaccinated	...	* I	...	...	...	* I
Vaccination doubtful	...	...	* I	...	...	* I
I mark	...	...	...	* I	** 2	*** 3
2 marks	...	...	...	* I	...	* I
3 marks	...	...	...	...	...	...
4 marks	..	...	* I	...	...	* I
Over 4 marks	...	...	...	...	...	...
Totals	...	* I	** 2	** 2	** 2	******* 7

TABLE XVIA.—TOTALS.

Age-Groups	1904	Deaths	1903 and 1904	Deaths	Fatality per cent.
Unvaccinated	19	4	52	10	19·2
Vaccination doubtful	4	1	35	6	17·1
1 mark	15	2	65	7	10·8
2 marks..................................	36	1	146	4	2·7
3 marks..................................	30	...	115	3	2·6
4 marks..................................	33	1	95	2	2·1
Over 4 marks	2	...	6	...	...
Totals	139	9	514	32	6·2

Tables showing the relationship of the severity of the disease to the total area of the primary vaccination marks :—

TABLE XVII.—(1) DISCRETE ATTACKS: NUMBER OF CASES.

No deaths occurred.

Age-Groups	0–4	5–14	15–24	25–44	45 +	TOTAL
Unvaccinated	8	11	5	5	...	29
Vaccination doubtful	3	5	3	7	8	26
Area up to ¼″........................	...	1	5	16	17	39
¼″—½″	...	7	9	33	20	69
½″—1″	...	9	26	71	21	127
Over 1″..................................	...	5	38	88	7	138
Total	11	38	86	220	73	428

Table XVIII. - (2) Semiconfluent Attacks.

* = A Death.

Age-Groups	0–4	5–14	15–24	25–44	45 +	Total
Unvaccinated	3	2	4	...	...	9
Vaccination doubtful	1	...	1	1	* 1	* 4
Area up to ¼″	...	...	1	2	* 3	* 6
¼″—½″	...	...	1	3	* 2	* 6
½″—1″	...	...	1	6	2	9
Over 1″...	...	...	1	9	1	11
Totals...........................	4	2	9	21	*** 9	*** 45

Table XIX.—(3) Confluent Attacks.

* = A Death.

Age-Groups	0–4	5–14	15–24	25–44	45 +	Totals
Unvaccinated	** 2	* 2	** 4	*** 4	* 1	********* 13
Vaccination doubtful	...	...	...	** 2	** 2	**** 4
Area up to ¼″	...	...	...	* 1	*** 3	**** 4
¼″—½″	...	...	...	** 2	** 4	**** 6
½″—1″	...	...	...	3	...	3
Over 1″...............................	...	...	1	* 3	...	* 4
Totals...........................	** 2	* 2	** 5	********* 15	******** 10	********************** 34

TABLE XX.—(4) HÆMORRHAGIC ATTACKS.

* = A Death.

Age-Groups	0–4	5–14	15–24	25–44	45 +	TOTALS
Unvaccinated	...	* 1	...	...	...	* 1
Vaccination doubtful	...	...	* 1	...	...	* 1
Area up to ¼″	...	...	...	...	** 2	** 2
¼″—½″	...	...	...	* 1	...	* 1
½″—1″	...	...	...	* 1	...	* 1
Over 1″	...	...	* 1	...	...	* 1
Totals	...	* 1	** 2	** 2	** 2	******* 7

TABLE XXA—TOTALS.

Age-Groups	1904	Deaths	1903 and 1904	Deaths	Fatality per cent.
Unvaccinated	19	4	52	10	19·2
Vaccinated doubtful	4	1	35	6	17·1
Up to ¼″	8	2	51	7	13·7
¼″ to ½″	21	...	82	6	13·2
½″ to 1″	33	1	140	1	0·7
Over 1″	54	1	154	2	1·3
Totals	139	9	514	32	6·2

The most interesting of these are Tables XVIA. and XXA. They demonstrate the increased safety gained by (1) having more than one vaccination mark, and (2) by having an area over a half square inch of cicatrix. All that can be said for one mark is that it is much better than none at all. The same may be said of areas of ½in., and less, of cicatrix. These figures show, so far as they go, only a small lessening of fatality per cent. by having more than two marks for primary vaccinations, but the numbers are small.

Two deaths occurred in 154 patients with cicatrix areas of over 1in., while only one death occurred in 140 patients with areas of from ½in. to 1in. A cicatrix area of from ½in. to 1in. gives in this return results as satisfactory as an area of over 1in. for primary vaccinations. These figures suffice to show quite clearly, however, the great protection afforded by an area of vaccination exceeding ½in. in extent.

Judging from these and other tables, private practitioners should be instructed that *nothing less* than two marks of a combined area of *over* ½in. can be considered a sufficient vaccination, and should be asked to give certificates of *sufficient* rather than of *successful* vaccination, stating always the area of cicatrices and their number.

[Our statistics indicate two marks *as being only slightly less efficient than a greater number.* In Dr. Barry's classification of 825 cases occurring in the Sheffield epidemic (1887-1888), and in Mr. Marson's classification of over 13,000 post vaccinal cases occurring between 1836 and 1867, the mortality percentage is markedly diminished by a greater number of marks.]

Dr. Barry's Figures.

Number of Cicactrices	Totals	Deaths	Fatality per cent.
0 or 1	95	13	13·7
2	259	24	9·3
3	372	21	5·7
4 or more	99	2	2·0

Mr. Marson's Figures.

Post Vaccinal Cases	Percentage Case Fatality	
No. of Marks	1836-51 (3,084 cases)	1852-67 (10,661 cases)
No cicatrix	25·5	40·3
1	9·2	14·8
2	6·0	8·7
3	3·6	3·7
4 or more	1·1	1·9

Table XVIb.

	Unvaccinated		Vaccination Doubtful		1 Mark		2 Marks		3 Marks		4 Marks		Over 4 Marks	
	Totals	Ratio	Totals	Ratio	Totals	Ratio	Totals	Ratio	Totals	Ratio	Totals	Ratio	Totals	Ratio
Discrete	29	1·3	26	2·9	53	4·4	128	6·7	104	10·4	85	8·5	3	1·0
Other Forms..............	23	1·0	9	1·0	12	1·0	19	1·0	10	1·0	10	1·0	3	1·0

Table XXb.

	Up to $\frac{1}{4}''$		$\frac{1}{4}''$ to $\frac{1}{2}''$		$\frac{1}{2}''$ to $1''$		Over $1''$	
	Totals	Ratio	Totals	Ratio	Totals	Ratio	Totals	Ratio
Discrete	39	3·2	69	5·3	127	9·8	138	8·6
Other Forms	12	1·0	13	1·0	13	1·0	16	1·0

Tables XVIb. and XXb. show the proportion of discrete cases in relation to other forms of the disease occurring in vaccinated and unvaccinated cases. It should be remarked here that some semi confluent cases are less severe than some discrete cases.

Table VII.—Showing Duration of Isolation in Hospital in relation to Condition as to Vaccination of Cases admitted within 4 Days of the appearance of the Rash (1903-4).

Period of Isolation	Vaccinated		Unvaccinated		Vaccination Doubtful	
	No. of Cases	Percentages of such vaccinated cases	No. of Cases	Percentages of such unvaccinated cases	No. of Cases	Percentages of such cases
0— 14 days ...	103	26·0	...	...	2	6·0
14— 21 days ...	121	30·4	5	14·7	3	9·0
21— 28 days ...	62	15·6	8	23·5	9	27·3
4— 6 weeks ...	70	17 6	10	29·4	7	21·8
Over 6 weeks ...	42*	10·6	11†	32·4	12	36·4

One case * an invalid (heart case).

One case † kept in from charity.

Table VII. gives the duration of stay in hospital of vaccinated and unvaccinated cases. Patients who died are not included. Seeing that a greater percentage of the unvaccinated than the vaccinated died, and that those cases would have remained in hospital longer than the milder cases if they had lived, there is not so marked a lengthening of stay in hospital of the unvaccinated as one would be led to expect from the much greater percentage fatality.

There is a probability that sometimes vaccinations which appear to be successful, and which have scars, may really be unsuccessful. With septic lymph, an improperly cleansed or an improperly dressed arm, such a result may occur. It is difficult to explain in any other way how No. 13 in Table XXIIIa. was infected. In this young girl, there were 4 revaccination marks with an area of $1\frac{1}{4}''$. Nos. 16, 17, and 5 were young and well vaccinated primarily. In the first case, only 14 months previous to Smallpox, revaccination had been performed, but the area of the mark was only $\frac{1}{8}''$. In No. 17 5 years had elapsed, and the area of the single mark was $\frac{1}{4}''$. In No. 5 the revaccination seemed good, but seven years had elapsed.

REVACCINATION.

In view of the fact that at the present time a Revaccination Bill is under consideration, a detailed statement as to vaccination in these cases where there was sufficient proof of revaccination is given :—

TABLE XXIIIa.

	Primary Vaccination Cicatrices				Revaccination	
	Age	Their Number	Area	Age at Vaccination	How long since	Evidence as to success of Vaccination
1	48	4	$\frac{5}{16}''$	Infancy	22 years	4 cicatrices, area 1″
2	35	2	$\frac{1}{4}''$	Infancy	14 years	3 cicatrices, area $1\frac{1}{8}''$
3	46	1	$1\frac{1}{4}''$	Infancy	39 and 16 years	1 cicatrix 39 years ago, area $\frac{3}{4}''$ 1 cicatrix 16 years ago, area $\frac{3}{8}''$
4	59	3	$\frac{7}{8}''$	Infancy	48 years	3 marks
5	25	3	$\frac{3}{4}''$	Infancy	7 years	3 marks, area 1″
6	38	2	$\frac{1}{2}''$	Infancy	22 years	2 marks, area $\frac{3}{4}''$
7	35	3	$\frac{3}{4}''$	Infancy	20 years	2 marks, area $\frac{3}{4}''$
8	43	3	$\frac{9}{16}''$	Infancy	Over 30 years	2 marks, area $\frac{3}{8}''$
9	32	2	$\frac{3}{4}''$	Infancy	16 years	1 mark, area $\frac{3}{8}''$
10	56	4	$\frac{5}{8}''$	Infancy	34 years	3 marks, area $\frac{9}{16}''$
11	39	1	$\frac{3}{8}''$	Infancy	30 years	3 marks, area $\frac{3}{4}''$
12	39	2	$\frac{1}{2}''$	Infancy	30 years	3 marks, area $\frac{3}{4}''$
13	15	1	$\frac{1}{4}''$	Infancy	4 years	4 marks, area $1\frac{1}{2}''$
14	42	1	$\frac{1}{2}''$	Infancy	29 years	2 marks, area $\frac{1}{2}''$
15	54	4	$1\frac{1}{2}''$	Infancy	30 years	3 marks, area 1″
16	27	4	$1\frac{1}{4}''$	Infancy	14 months	1 mark, area $\frac{1}{8}''$
17	23	3	$\frac{1}{2}''$	Infancy	5 years	1 mark, area $\frac{1}{4}''$

Case 7, although revaccinated at the age of 15, and primarily well vaccinated, had a semiconfluent attack at the age of 35.

Out of 595 cases admitted to hospital, 17 or nearly 2·9 per cent. were certainly revaccinated, and probably a greater percentage.

Since 1874, in Germany, revaccination of all school children at the age of twelve has been compulsory, and it is said that practical immunity from Smallpox is enjoyed. It must be remembered, however, that all males are revaccinated on joining the army.

TABLE XXIII.—REVACCINATIONS—(NO. OF CASES).

* = A Death.

TIME ELAPSING BETWEEN REVACCINATION AND ATTACK	1—10 years	10—20 years	20—30 years	Over 30 years	Time uncertain	Revaccinated successfully in the Incubation Period
Discrete	7	3	4	6	2	35*
Semiconfluent	...	...	...	...	...	1*
Confluent	...	...	...	...	...	...
Hæmorrhagic	...	...	...	...	...	...

TABLE XXIV.—LIST OF PATIENTS VACCINATED DURING THE INCUBATION PERIOD BUT TOO LATE TO PREVENT ATTACK.

* = A Death.

DAY OF INCUBATION ON WHICH THE VACCINATION WAS PERFORMED	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th
Discrete	...	...	1	10	6	8	6*	4	2*	1	3	2	...	...
Semiconfluent	...	...	...	...	...	1*	...	...	...	...	...	...	...	...
Confluent	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hæmorrhagic	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE XXIVa.

This table includes all cases vaccinated between infection and the onset of illness :—

No	Primary Vaccination				Revaccination		
	Age	Number of Marks	Area	Age	Interval between Vaccination and rash in previously Unvaccinat'd persons	Interval between Re vaccination and rash, in days	Remarks
1	10	4	1″	Infancy	......	6	......
2	42	4	$1\frac{1}{4}$″	Infancy	......	9	......
3	11	1	$1\frac{1}{4}$″	Infancy	......	7	......
4	54	2	$\frac{3}{8}$″	Infancy	......	9	Semi confluent, died
5	15	1	1″	Infancy	......	7	......
6	28	3	$1\frac{1}{4}$″	Infancy	......	10	......
7	25	3	$1\frac{1}{2}$″	Infancy	......	3	......
8	34	2	$1\frac{1}{2}$″	Infancy	......	10	......
9	24	5	$1\frac{1}{2}$″	Infancy	......	7	......
10	25	3	$\frac{3}{4}$″	Infancy	......	8	......
11	44	2	$\frac{5}{16}$″	Infancy	......	10	......
12	40	1	$\frac{1}{2}$″	Infancy	......	10	......
13	33	4	1″	Infancy	......	9	......
14	52	2	1″	Infancy	......	3	......
15	34	0	...	......	2 days	......	Stated to be unvaccinated
16	1	...	...	......	3 days	......	......
17	35	2	$\frac{3}{8}$″	Infancy	......	6	......
18	55	...	...	......	......	10	Stated to have been vaccinated in infancy
19	29	4	$1\frac{1}{2}$″	Infancy	......	2	Semi confluent
20	22	...	...	......	7 days	......	Stated to be unvaccinated
21	16	4	$\frac{3}{4}$″	Infancy	......	8	......
22	28	4	1″	Infancy	......	9	......
23	1 day	...	...	......	7 days	......	Discrete, died
24	18	4	1″	Infancy	......	10	......
25	38	3	$1\frac{1}{8}$″	Infancy	......	9	......
26	17	...	...	......	9 days	......	......
27	39	2	$\frac{3}{4}$″	Infancy	......	10	......

TABLE XXIVa.—*Continued.*

No.	Primary Vaccination: Age	Number of Marks	Area	Age	Revaccination: Interval between Vaccination and rash in previously Unvaccinat'd persons	Interval between Re-vaccination and rash, in days	Remarks
28	39	3	$\frac{3}{4}''$	Infancy	......	8	......
29	40	2	$\frac{3}{4}''$	Infancy	......	8	......
30	43	3	$1\frac{1}{8}''$	Infancy	......	7	......
31	17	4	$\frac{3}{4}''$	Infancy	......	8	......
32	19	3	$1\frac{1}{8}''$	Infancy	......	9	......
33	32	4	$1\frac{1}{2}''$	Infancy	......	10	......
34	11	...	...	......	6 days	......	Discrete, very mild
35	6	...	...	......	11 days	......	......
36	17	2	$\frac{3}{4}''$	Infancy	......	8	......
37	54	4	$1\frac{1}{2}''$	Infancy	......	6	Revaccinated
38	2 days	...	...	......	5 days	......	Discrete, died
39	34	3	$1\frac{1}{2}''$	Infancy	......	8	......
40	22	...	...	......	10 days	......	......
41	60	2	$\frac{1}{16}''$	Infancy	......	4	......
42	43	2	$\frac{3}{4}''$	......	......	5	......
43	3 months	...	...	......	8 days	......	......
44	1 day	...	...	......	10 days	......	Discrete, symptoms severe

The effect of Vaccination performed between infection and the appearance of the rash.

Three of the cases enumerated above died, but it must be remembered that two were newly-born children and one a man of 54. Although the numbers are so small they make for the opinion that vaccination is useful in modifying variola, even when performed too late to prevent its occurrence.

Second attack of Smallpox.

Case 90, M 60, states that he had Smallpox in the first year of life. He adds that a neighbour who had the disease, and whose child died from Smallpox, afterwards suckled him, also his brother died from the same disease at the time. His recent attack was overlooked, only two seeds remaining in the feet when it was seen. The eruption was not noticed by the patient. On account of the attack of Smallpox, or of some concurrent illness, he was confined to the house for a fortnight, infecting his wife and a lodger.

Evidence of disease from Vaccination.

No cases of generalised vaccinia have been observed during the year.

One hundred and seventy one contacts at large works were revaccinated by me, and many contacts in private houses.

There have been the usual inflamed arms, with enlargement and tenderness of the axillary glands. There have been also cases of indefinite illness, in which loss of appetite, sickness and vomiting, and unfitness for work were complained of. Those symptoms occurred in some cases in which the local signs were not severe, but all were more or less transitory, disappearing within a few weeks.

Complications in Hospital.

	Number of Cases, 1904	Percentages, 1904	Percentages, 1903	Percentages 1903 and 1904
Conjunctivitis 12				
Eye Corneal Ulcer 3	17	11·7	13·0	12·2
Initis 2				
Boils	3	2·0	11·1	9·0
Sore Throat......................	3	2·0	5·5	4·7
Rheumatism	2	1·4	3·2	2·8

The very low percentage of complications may be partly due to the fact that 146 patients were admitted in 1904, compared with 426 in 1903.

The following cases, in addition to Smallpox, were also suffering from another well-marked disease at the time of admission :—

One case had Scabies.

One case had Secondary Syphilis.

Two cases had Phthisis.

One case had Whooping Cough.

One case had Chronic Bronchitis.

The following 13 cases admitted to Clayton Hospital were not suffering from Smallpox :—

Five children were taken in along with their parents.

Two adults were detained in hospital for disinfection.

Three patients were admitted as varicella (doubtful); one of these, an unvaccinated girl aged 16, developed the Chickenpox rash at the same time as a neighbour developed the Smallpox rash.

Three patients had rashes simulating the Smallpox rash.

Duncan Forbes, M.D.

SCARLET FEVER.

I beg to present a report on the incidence and spread of Scarlet Fever during 1904.

Table 1 shows the attacks in weeks. The disease was most prevalent, as is usual, in the 4th quarter. A sudden rise occurred in the 33rd and 34th weeks, the numbers remained very steady for the next five weeks, but there was again a sudden rise to the maximum of the year in the 49th week. Thereafter, the cases decreased fairly uniformly to the end of the year.

TABLE 1.

SCARLET FEVER, 1904.—ATTACKS IN WEEKS ACCORDING TO DATE OF RASH.

First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Jan. 9	22	April 9	32	July 9	49	Oct. 8	72
,, 16	36	,, 16	37	,, 16	35	,, 15	52
,, 23	38	,, 23	44	,, 23	40	,, 22	66
,, 30	31	,, 30	30	,, 30	37	,, 29	61
Feb. 6	32	May 7	34	Aug. 6	28	Nov. 5	62
,, 13	26	,, 14	48	,, 13	20	,, 12	57
,, 20	33	,, 21	26	,, 20	37	,, 19	49
,, 27	34	,, 28	18	,, 27	62	,, 26	48
Mch. 5	32	June 4	18	Sept. 3	52	Dec. 3	54
,, 12	41	,, 11	23	,, 10	48	,, 10	29
,, 19	35	,, 18	50	,, 17	49	,, 17	37
,, 26	26	,, 25	41	,, 24	54	,, 24	27
April 2	34	July 2	43	Oct. 1	50	,, 31	24
Total...	420	Total...	444	Total...	561	Total...	638

City Total, 2,063.

Table 2 gives the attack rate for the last 6 years.

TABLE 2.

SCARLET FEVER ATTACKS, 1904.—RATES PER 1,000 LIVING, COMPARED WITH MEAN OF FIVE YEARS.

	1899	1900	1901	1902	1903	Mean	1904
Twelve Towns *	5·10	4·82	5·07	5·80	4·34	**5·03**	3·93
City of Manchester	2·69	4·62	4·93	4·15	3·63	**4·00**	3·69
Manchester Township	2·27	3·49	3·66	3·07	3·18	**3·13**	2·89
North Manchester	4·07	5·85	5·30	5·09	4·27	**4·92**	4·49
South Manchester	2·12	4·44	5·37	4·09	3·43	**3·89**	3·55

* These are Blackburn, Bolton, Bradford, Burnley, Huddersfield, Hull, Leeds, Liverpool, Oldham, Preston, Salford, and Sheffield.

For the last 18 years the number of attacks per 10,000 living are as follows:—

From 87–95:—47 38 35 51 48 50 58 43 39

From 96–04:—44 33 16 27 46 49 42 36 37

The year 1898 formed the bottom of the trough of the last wave of incidence, and the year 1901 its crest

In 1902 and 1903 there were falls. 1904 is for practical purposes equal to 1903.

It should be observed that the attack rate in Manchester keeps below the rate for the 12 towns.

Table 3 shows that the highest attack rate occurred in Blackley, Bradford, Clayton, and Beswick; whilst Blackley, along with Ancoats and Central, show the highest case fatality.

TABLE 3.

1904—SCARLET FEVER ATTACKS IN DISTRICTS, WITH ATTACK RATE, CASE FATALITY PER CENT., AND REMOVALS TO HOSPITAL PER CENT.

DISTRICTS	ATTACKS	ATTACK RATE PER 1,000 LIVING	† CASE FATALITY PER CENT.	REMOVALS TO HOSPITAL PER CENT.
Ancoats	135	3·06	8·9	87·4
Central	59	2·12	8·5	88·1
St. George's	184	3·13	3·3	89·7
Cheetham	169	4·28	2·4	78·1
Crumpsall	42	4·60	2·4	66·7
Blackley	56	6·01	8·9	62·5
Harpurhey	70	3·72	4·3	78·6
Moston	61	3·96	1·6	78·7
Newton Heath	130	3·46	2·3	81·5
Bradford	145	5·91	3·5	80·0
Beswick	63	5·20	6·3	82·5
Clayton	59	5·55	1·7	72·9
Ardwick	161	3·75	3·7	81·4
Openshaw	117	4·16	7·7	73·6
Gorton (West)	121	3·94	2·5	86·7
Rusholme and Kirk	98	3·79	3·1	65·4
Chorlton-on-Medlock	183	3·21	3·3	74·3
Hulme	210	3·21	3·8	83·3
City of Manchester	2063	3·69	4·1	79·8

† Corrected: the fatal cases are those actually occurring amongst the cases notified.

Table 4 demonstrates that Scarlet Fever is most fatal in the 1st year of life, and becomes less and less so, reaching the lowest mark of fatality at the 10-15 year age period. It also shows that the incidence is greatest in the 5th and 6th years of life. The greatest number of deaths occurs in the 4th year

of life. As one would expect from the slightly increased incidence, along with a diminished death-rate, one finds the case fatality per cent. smaller for 1904 than 1903.

TABLE 4.

SCARLET FEVER.—NUMBER OF ATTACKS, OF DEATHS, AND CASE FATALITY PER CENT. AT DIFFERENT AGES, FOR THE TEN YEARS 1894-1903, AND FOR 1904.

Ages	1894-1903			1904		
	Attacks	Deaths	Case Fatality per cent.	Attacks	Deaths	Case Fatality per cent.
Under one year ...	256	55	21·5	18	7	38·9
1 to 2 years ...	767	136	17·7	61	8	13·1
2 to 3 „ ...	1,461	205	14·0	145	16	11·0
3 to 4 „ ...	1,925	223	11·6	162	11	6·8
4 to 5 „ ...	2,201	193	8·8	228	11	4·8
5 to 6 „ ...	2,162	96	4·4	239	8	3·3
6 to 7 „ ...	1,968	71	3·6	211	5	2·4
7 to 8 „ ...	1,783	52	2·9	176	3	1·7
8 to 9 „ ...	1,422	27	1·9	185	2	1·1
9 to 10 „ ...	1,199	21	1·8	146	3	2·1
10 to 15 „ ...	3,405	49	1·4	346	8	2·3
15 to 20 „ ...	1,030	30	2·9	77	...	...
20 to 25 „ ...	486	9	1·9	25	...	...
25 to 35 „ ...	375	10	2·7	31	1	3·2
35 to 45 „ ...	95	3	3·2	11	1	9·1
45 to 55 „ ...	28	1	3·6	2	1	50·0
55 to 65 „ ...	5	...	...	...	...	...
Over 65 „ ...	...	...	...	...	...	...
All Ages	20,568	1,181	5·7	2,063	85	4·1

Table 5.

Scarlet Fever Mortality, 1904.—Rate per 1000 living, compared with mean of five years.

	1899	1900	1901	1902	1903	Mean	1904
England and Wales............	0·12	0·11	0·13	0·19	0·12	**0·13**	0·11
*76 Great Towns	0·13	0·13	0·17	0·19	0·14	**0·15**	0·12
London...........................	0·09	0·08	0·13	0·12	0·08	**0·10**	0·08
Manchester City............	0·08	0·19	0·23	0·27	0·17	**0·19**	0·15
Manchester Township	0·08	0·16	0·24	0·21	0·14	**0·17**	0·17
North Manchester	0·09	0·24	0·25	0·31	0·21	**0·22**	0·16
South Manchester	0·09	0·18	0·22	0·26	0·17	**0·18**	0·14
*142 Smaller Towns	0·12	0·12	0·14	0·14	0·12	**0·13**	0.13
Rural Districts..................	0·10	0·10	0·10	0·10	0·10	**0·10**	0·09

* The rates for 1901 and previous years are for the 33 Great Towns and 67 Smaller Towns, and for 1902-3 for 103 Smaller Towns.

Table 6.—Scarlet Fever.

		1891	1892	1893	1894	1895	1896	1897
Manchester Township.	Removal to Hospital, per cent.	72·3	71·1	76·3	79·1	82·0	83·5	89·2
	Death-rate per 1,000 ...	0·22	0·35	0·23	0·26	0·37	0·41	0·27
City.	Removal to Hospital, per cent.	61·1	58·5	58·6	66·0	71·3	73·9	79·7
	Death-rate per 1,000 ...	0·22	0·27	0·27	0·22	0·33	0·37	0·23

		1898	1899	1900	1901	1902	1903	1904
Manchester Township.	Removal to Hospital, per cent.	85·8	87·2	88·0	88·5	88·8	91·9	88·6
	Death-rate per 1,000 ...	0·11	0·08	0·16	0·24	0·21	0·14	0·17
City.	Removal to Hospital, per cent.	73·1	74·4	80·9	82·3	81·2	83·4	79·8
	Death-rate per 1,000 ...	0·12	0·08	0·19	0·23	0·27	0·17	0·15

The chief object of all Public Health work in relation to Scarlet Fever is to limit the spread of the disease. In attempting to do so we are dependent on the head of the family primarily. If such an one is an observant person, then even very mild cases of the disease are likely to be detected and a doctor called in. Secondarily, we are dependent on the doctor who notifies the case.

In all cases after the notification is received isolation, in a greater or less degree, is carried out.

The following tables give an indication as to the importance of early isolation in this disease. Isolation is supposed to begin on the day of notification in cases nursed at home, and on the day of removal in cases taken to hospital.

Table 7.

Showing the number of susceptible contacts stated to be present in households at the notification of the first case, and the numbers subsequently affected :—

Days between notification and isolation ...	0	1	2	3	4–7	8–14	14+	35+
Susceptible contacts ...	957	2110	1464	838	531	393	434	31
Number affected.........	17	67	44	36	32	31	29	5
Percentage affected ...	1·8	3·2	3·0	4·3	6·0	7·9	6·7	16·1
Susceptible contacts (under 15)	390	835	617	350	221	188	179	12
Number affected.........	17	66	38	31	28	30	27	5
Percentage affected ...	4·4	7·9	6·0	9·0	12·7	16·0	15·1	41·7

This table indicates sufficiently, without further comment, the importance of early isolation.

It points to a high infectivity in the first few days, and also a long infective period in the mildest cases.

TABLE 8—SHOWING THE INTERVAL IN WEEKS BETWEEN THE ERUPTION IN THE FIRST CASE AND IN SUBSEQUENT CASES.

Rash Intervals in weeks	–1	–2	–3	–4	–5	–6	–7	–8	–9	–10	–11	–12	–13	–14	–15	–16	–17	–18	–19	–20	–21	22+
Subsequent cases in which primary case not removed at all or before its return from Hospital ...	147	69	28	15	10	4	2	...	2	...	...	...	...	...	1	...	...	...	...	1	...	1
Subsequent cases occurring in houses to which a case had returned from Hospital	...	...	...	...	...	...	12	18	27	17	21	12	10	7	3	3	2	1	2	2	4	$2^{(208)}_{(232)}$
Totals	147	69	28	15	10	4	14	18	29	17	21	12	10	7	4	3	2	1	2	3	4	3

Table 8 shows the Rash Intervals grouped in weeks of all known subsequent cases, and the primary cases giving rise to them. The sudden rise during the 7th and 8th weeks, which culminates in the 9th week, can be accounted for only by the influence of cases returning home from hospital. From the figures it is at once apparent that the hospital influence is a serious one.

These figures will now be given further consideration.

Rash Intervals in Days and Weeks	2	3	4	5	6	7	-14	-21	-28	-35	-42	-63	63+
A—Primary case not removed, or removed at most two days before the rash of the subsequent case	34	30	19	11	16	9	37	15	6	4	2	4	3
B—Subsequent cases having their rashes more than two, but less than nine, days after the removal of the primary case	...	3	7	5	7	6	13	1	1	1	...	...	...
C—Subsequent cases whose rash appeared over eight days after the removal of the primary case	...	...	...	..	...	...	19	12	8	5	2	...	...

In this Table, third and subsequent cases are represented as if infected by the first case occurring.

The subsequent cases may be divided as in the table above. Line B represents all subsequent cases which may or may not have been infected by the primary case directly. Line C gives cases which were not infected directly from the primary case. The two lines together give a record of all subsequent cases having their rashes more than two days after the primary case was removed to, but before its return from, hospital. This table gives an idea of the lessening power with the lapse of time of the infective influence in houses where a case of Scarlet Fever has occurred. Placing the totals of lines B and C in opposition with the subsequent cases occurring in houses after the return home of cases from hospital, the great augmentation of the infective influence by the return of these cases is apparent.

Rash intervals in weeks	1 week less 2 days	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22+
In cases occurring more than 2 days after the removal, but before the return of the primary case from Hospital ...	28	32	13	9	6	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
In cases occurring after the return of the primary case from Hospital	...	...	...	...	...	...	12	18	27	17	21	12	10	7	3	3	2	1	2	2	4	2

The above table deals only with cases removed to hospital.

Number of Cases considered	206	435	285	153	50	24	6	6	9	14	6	10	4	7	6	29	10	8	1
Days between Rash and Removal	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15–21	22–28	29–35	35 +
A—All Susceptible Contacts	912	1909	1212	649	369				277							215			
B—Percentage affected before return of Primary Case	2·1	2·9	3·5	5·4	7·6				10·8							12·1			
C—Percentage affected after return of Case from Hospital	2·5	2·6	2·0	2·0	1·3				3·6							0·5			
A—Contacts Susceptible under 15	384	763	531	281	171				136							99			
B—Percentage affected before return of Primary Case	5·0	7·2	6·8	10·7	15·2				21·3							24·2			
C—Percentage affected after the return of Case from Hospital	5·4	6·6	4·0	4·6	2·9				7·4							1·0			
Total percentage of all Susceptible Contacts affected	4·6	5·5	5·5	7·4	8·9				14·4							12·6			

The question arises as to the nature of the infective influence remaining in houses after the removal of the primary case.

The answer can only be speculative.

The following influences are worthy of consideration :—

(1) The infecting agent of the supposed primary case, probably in most instances being an overlooked case, remains active. Ninety-two cases occurred last year in which the rashes of the supposed primary and subsequent cases had intervals of one day or less. These cases were in most instances, no doubt, infected from a common source. The common source is most likely to be an overlooked case in the home. If the rashes in those cases had been separated by a greater interval they would have been regarded as primary and secondary.

(2) The primary case may leave a certain amount of infection in the house which is not removed by the disinfector.

(*a*) The primary case may give rise to attacks which, because of their extreme mildness, are overlooked.

(*b*) Virulent organisms may lie latent in the throat of certain individuals, either giving rise, at a subsequent date, to an attack in that individual or being transmitted by him to a more susceptible subject.

(There is no reason to believe that Scarlet Fever differs from Diphtheria in those respects.)

(*c*) Certain articles may be hidden away and escape disinfection, and at a later date be exposed to susceptible individuals.

In the preceding table the percentages of contacts affected from the onset in the primary case to the date of its return from hospital is compared with the percentage of cases occurring after the return of the primary case from hospital.

It will be observed that, according to the interval between rash and removal, the percentages of cases affected before the return of the primary case vary. On the contrary, the percentages affected after the return of the primary case seem to bear no relation to the date of removal.

This makes for the opinion that there is no effect on number of return cases produced—

(1) By the severity or mildness of the primary case (mild cases are frequently removed late in the disease).

(2) By the early or late removal of such a case.

Days between Rash and notification of the primary case	2	3	4	5	6	7	8–14	–21	–28	–35	–42	–63	63+	Totals
A.—Cases Removed to Hospital:														
Subsequent cases rashes occurring between the onset and before two days after removal of primary case	32	24	15	7	10	5	23	7	1	2	1	0	0	127
Subsequent cases occurring over two days after the removal of primary case to, but before its return from, Hospital	...	3	7	5	7	6	32	13	9	6	2	...	...	90
Percentage of possibly avoidable to total avoidable and unavoidable cases	...	11	32	42	41	54	58	65	90	75	66	...	...	41·5
B.—Cases Nursed at Home:														
Subsequent cases rashes occurring before two days after the notification of primary case received	2	6	3	2	4	4	11	4	3	1	...	...	...	40
Subsequent cases occurring over two days after reception of notification of the primary case.................	...	...	1	2	2	...	3	4	2	1	1	4	3	23
Percentage of possibly avoidable to total avoidable and unavoidable cases	...	0	25	50	33	...	27	50	40	50	100	100	100	36·5

This points to the patient acquiring a new strain of organism in hospital.

A question which is being seriously discussed is the utility of the isolation of Scarlet Fever cases.

An indication is given by a comparison between the percentages of cases arising in contacts in cases nursed at home and the percentages of contacts affected by the return of cases from hospital.

In such a comparison it would be obviously wrong to debit to the cases nursed at home cases in contacts, the rashes of which occurred before or within two days of the reception of the notification, seeing that those cases are infected before home isolation is commenced, or at all events before the case could have been removed to hospital. Those are therefore excluded.

Another point of considerable importance is that even if, instead of having been nursed at home, those patients had been removed to hospital on notification, a certain number of cases would have arisen having their rashes more than two days after the isolation, and before the return of the primary case from hospital.

Comparison is made in the table on page 66 between the percentages on the one hand of what may be called indirectly infected cases (rashes occurring two days after the removal to, but before the return of the primary case from hospital) out of total number of cases infected between onset of the primary case and its return from hospital, and on the other the percentage infected after notification of cases nursed at home out of the total number infected by cases nursed at home.

Of 217 subsequent cases in which the primary case was removed to hospital, 90 or 41·5 per cent. showed the rash over two days after the removal of the primary case to, but before its return from, hospital.

Of 63 subsequent cases in which the primary case was not removed to hospital, 23 or 36·5 per cent. showed the rash over two days after notification of the primary case.

When children are nursed at home, it is a common custom to send the other children to the houses of friends; this may account for the smaller percentage number of possibly avoidable cases occurring in those nursed at home.

The numbers being so small, however, the only certain conclusion is that a considerable number of cases which arose would have arisen even if the child had been sent to hospital on notification instead of being nursed at home.

Days Between Rash and Notification.

	0	1	2	3	4–7	8–14	15+	Totals	Total Return Cases
Number of Primary Cases nursed at Home	15	56	78	57	55	31	53	...	...
Susceptible Contacts	45	201	252	189	162	116	219	1184	5723
Number of Cases occurring amongst these	...	11	2	1	4	1	3	22	...
Percentage affected	0	5·5	·8	·5	2·5	·9	1·4	1	...
Percentage of Contacts affected after the return of Cases from Hospital	2·5	2·6	2	2	1·3	3·6	·5	...	2·3
Susceptible Contacts under 15	6	72	86	69	50	52	80	415	1150
Number of Cases occurring amongst these	...	11	2	1	2	1	3	20	...
Percentage affected	0	15·3	2·3	1·4	4	1·9	3·7	4·8	...
Percentages of Contacts under 15 affected after the return of Cases from Hospital	5·4	6·6	4	4·6	2·9	7·4	1	...	4·7

Leaving this important factor out of account, a table of comparison between the percentage number of cases arising amongst contacts in which the primary case was nursed at home, and the percentage number of cases arising amongst contacts with cases returned from hospital, is given. (See Table, p. 68.)

In cases nursed at home, 1 per cent. of all contacts are affected; in contacts of cases returning from hospital, 2·3 per cent. develop the disease. For ages under 15 the totals are 4·8 and 4·7. *These results* point to a smaller spread of infection in the household from cases nursed at home, compared with cases sent to hospital. During 1904, however, the number of return cases is quite exceptional. The significance of these figures is lessened by the facts (1) that the families of cases nursed at home are smaller; (2) that their houses are larger and more carefully kept; (3) that the patient's friends are more intelligent, and take more pains to follow out instructions as to the avoidance of contact.

One is inclined to believe that where a child can have a comfortable room for its isolation, and its parents are intelligent, then it is best to have it nursed at home.

A list is given of all subsequent cases, along with particulars as to duration of stay in hospital of the primary case, complications in hospital, complications reported to be developed after return home, also the possible influence of schools. Subsequent cases which were not considered return cases are included in this list. The reason for not considering any subsequent case a return case is stated. This is one point in which these statistics differ from the majority, all known subsequent cases occurring at a house after the return of a case of Scarlet Fever from hospital are included as return cases excepting a few cases, in these latter, reasons are given for their exclusion. On the other hand, cases occurring outside the home to which the primary case returned are not included in the above statistics, although they are mentioned in the list below. It will be seen, also, that after the return of a case from hospital, not only the first, but all subsequent cases occurring in the house, are included as return cases.

The complications from which the patients suffered during their residence in hospital are mentioned in the hospital note.

It must be distinctly understood that these complications did not exist on discharge, excepting where there is a special note to that effect.

All the undermentioned cases excepting two arose in connection with cases discharged from Monsall Hospital. One arose from a case discharged from Baguley Sanatorium, and one from a case discharged from a fever hospital of a seaside resort. (See Tables.)

Originating Case			Return Case			Days	Intervals						
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes	Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School
1842	f.	11	4	f.	7	4	39	18	61	Nil	Nil	Slept together for 3 nights before rash on R.C.	$\frac{2}{965}$
1714	m.	10	42	m.	2	1	49	33	83	Nil	Nil	In same bed 14 days	At home
1870	f.	6	30	f.	32	1	41	15	57	Nil	Discharge from nose and eyes every day since return	Handkerchiefs used left carelessly about the house	At home
1757 1758	m. f.	*7 3	60	...	...	3 2	54 45	23 32	80 79	No hospital Notes	Scurvy-looking patch on face. Quite dry on leaving hospital, but began to run one week later and continued up to time R.C.	....	$\frac{2}{483}$
1591 1638 1639	f. f. m.	7 3 6	64	m.	6	1 1 1	47 91 Dates no	59 7 t noted in	107 99 register	In hospital 92 days. Became delicate in hospital. Not transferred to Convalescent Wards. Nephritis, Varicella, Otorrhœa, and Mastoid Abscess. Free on discharge	? Nil ?	......	$\frac{0}{1053}$
1687	m.	7	72	f.	$\frac{19}{12}$	1	53	40	94	Nil	Nil	1678 itself a return case from 1241	At home
1918	m.	4	76	f.	2	1	46	12	59	Nil	Nasal discharge, sore on lip	1918 itself a return case	At home
1796 1805	m. m.	6 3	89	f.	6	2 1	63 43	3 22	68 66	Small patch of Chronic eczema on forehead	Nasal discharge pointed out by doctor 3 days after discharge	Slept with case 89	$\frac{2}{1202}$

* Died.

Originating Case			Return Case			Day	Intervals			Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	Cases at School between Rashes O. and R. C., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
2015	f.	5	132	m.	4	2	41	10	53	Rhinitis	Skin peeling off child's forehead	......	$\frac{0}{600}$
1963	m.	4	140	m.	3	3	52	9	64	Nil	Ears noticed discharging the day after left hospital. Continued for 3 days	.. ...	$\frac{0}{488}$
140	m.	3	530*	m.	2	2	66	11	79	Arthritis, Rhinitis	Sore ear on discharge	140 itself a R.C.	Home
			597†	f.	5	...	...	25	93	......	.. ...	Lived opposite, played together	$\frac{1}{488}$
2061	m.	8	171	m.	6	2	46	6	54	Nil	Nil	......	$\frac{1}{282}$
1953	m.	9	173	m.	14	14	52	22	88	Nil	Ringworm, nose "stuffled"	173 slept with 1953 2 office companions of 173 had illnesses during the fortnight preceding 173's rash. One had sore throat 5 days before 173's rash, but remained at work up to the day of 173's onset	Not at school
1954	m.	5				6	48	26	80	Nil	Nil		
1955	f.	7				4	4	Died	...				
1956	f.	11				0	45	29	74	Nil	......		
1967	m.	15				1	R.C. occur	red before	discharge				
173	m.	14	503	f.	13	0	37	29	66	Nil	Nil	173 itself a R.C.	?
1942	f.	5	174	m.	13	2	61	16	79	?	Discharged 26th Jan. Discharges of matter regularly since return on 28th Jan. Said to have commenced with measles	174 kissed 1942 frequently. Separate bed, towel, handkerchief	$\frac{0}{478}$
1943	f.	8				1	47	30	78	?			

* Died † From another house.

Originating Case			Return Case			Days	Intervals						
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes	Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School
2082	m.	4	312	m.	9	1	47	27	75	Rhinitis and Otorrhœa	Nil	184 took ill on day of 2082's return from hospital, and was removed 2 days later. 2 cases returned after Sc. F. from Monsall Hospital to a house quite near (9–13) [One had ear discharge.] 25 days before rash in 312. Ages 3 and 2. No contact known of	$\frac{4}{573}$
1927	m.	6	191	m.	8	2	76	5	83	Rhinitis, Otitis	Nil	......	$\frac{0}{360}$
2018	f.	5	233	m.	11	11	68	5	84	2018 had Psoriasis on admission and discharge. Rotheln, Rhinitis ?	......	......	$\frac{6}{573}$
2019	f.	7	...	...	..	3	40	33	76		......	......	...
2117	f.	7	243	f.	3	1	47	7	55	Rhinitis	Ni	2117 itself a return case. Use same towel. Not sleeping together	At home
2	f.	6	268	m.	12	10	36	19	65	Rhinitis	Sore nose and nasal discharge on discharge. Slight peeling on both heels 20 days after discharge	......	0 in Salford

Originating Case			Return Case			Days	Intervals						
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes	Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School
2104	m.	9	279	f.	11	...	49	14	63	Nil	......	2104 slept in same bed as 279; 2104 itself return case from 1637	$\frac{4}{965}$
1972	m.	6	291	f.	5	1	46	45	92	Had a little loose skin on the heels on discharge	?	......	$\frac{0}{149}$
1790	f.	6	...	...	...	2	42	80	124	?	?	......	...
1928	m.	3	328	f.	27	1	66	42	109	Rhinitis	Has had a sore nose (date not given)	After discharge four days in Liverpool with father. Father to hospital there. For 20 days with grandmother, then returned home. 1928 itself a return case	At home
			329	f.	1	...	...	43	110				
			Father at Liverpool	m.	29	...	...	5	72				
70	f.	12	334	f.	15	2	50	4	56	Rhinitis in hospital and slightly on discharge. Conjunctivitis	Running at nose on discharge. This has persisted	......	At home
66	m.	4	352	f.	2	1	45	11	57	Rhinitis and Onychia. On discharge some loose skin on feet	Mother noticed nothing except what she considered was the result of a severe cold; greenish-yellow nasal discharge. Complained of nose hurting him when being washed	......	At home

Originating Case			Return Case			Days	Intervals			Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
91	m.	2	364	f.	7	2	47	9	58	Nil	Nil	......	$\frac{5}{774}$
68	f.	5	393	m.	10	3	43	16	62	Rhinitis	Dr. Paton called in 4 days after discharge, and has been prescribing for her since for Kidney Disease	......	$\frac{0}{852}$
192	f.	5	405 406 557*† 571†	m. m. f. m.	4 2 4 4	1	39	6 6 31 34	46 46 71 74	Rhinitis and Otitis during residence. Rhinitis on admission	Discharge from her nose continually since discharge	Did not sleep in same bedroom From a house in same street. Case 557 played with 192 every day from time of her return	405–406 At home
145	f.	9	478	f.	8	2	35	34	71	No hospital note	No discharges in O. C.	Play together	$\frac{5}{1268}$
162	f.	6	562	f.	4	1	41	37	79	SkinFaucesnormal No Nasal discharge or ear discharge when discharged from hospital	Taken straight to Bolton for one month after discharge. Child's feet peeled there	?	At home
251	f.	10	563*	f.	47	2	44	15	61	Nil Tonsils and adenoids removed while in hospital	Nil	......	At home
127	f.	6	587	m.	4	1	81	11	93	Otitis and Rhinitis	Nasal discharge 10 minutes after leaving hospital	583 played with 127	$\frac{7}{790}$
...	...		583†	f.	6	...	..	10	92	Chronic eczema of face—last on discharge			

Originating Case			Return Case			Days	Intervals			Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	Cases at School between Rashes O. and R. C., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
303	f.	9	596	m.	6	2	48	8	58	Nil	Sores at back of patient's ear, amongst the hair	......	$\frac{2}{436}$
322	m.	$\frac{19}{12}$	629	f.	5	4	51	9	64	Not in acute wards Nil	Nil	......	$\frac{0}{815}$
228	m.	12	634	m.	5	1	1	...	79	......	....	......	...
347	f.	7	...	...	...	2	46	9	57	Some loose skin on feet on discharge. Right Otorrhœa and nasal discharge in hospital	Discharge from nose, which began one day after leaving hospital	......	$\frac{5}{796}$
411	m.	7	639	m.	4	4	38	4	46	Nil	Nil	Not slept with patient but was in the same room	At home
153	f.	5	641	f.	9	...	92	4	96	Nasal discharge and Otorrhœa	Discharge from ear and nose in evening of the day of return	......	$\frac{0}{1047}$
641	f.	9	1169 1277 1384	m. m. m.	4 9 2	1	97	5 18 34	103 116 132	Otorrhæa	Discharge from ears and nose noticed the day after that of return	641 itself a return case	0 for several months 530 5 in last 4 months 167 At home
440	m.	11	677	f.	2	1	37	4	42	Nil	Nil	......	At home

Originating Case			Return Case			Days	Intervals						
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes	Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No of Cases at School between Rashes O. and R. C., also Average Number at School
342	m.	7	716	f.	5	2	64	8	74	Suppurating glands Haematuria. Discharged fromconvalescent side of an acute ward	Nil	......	$\frac{2}{503}$
416	m.	16	717	f.	12	1	41	14	56	Nil	Nil	O. C. came home to another house, the family having changed during his absence in hospital	1 in last 3 months 1134
539	m.	5	755	f.	3	1	41	7	49	No hospital note	Sore nose on day of discharge. Nasal discharge from day after discharge onwards	Medical attendant's note. "Patient's brother, age five, returned from Monsall with an irritating discharge from the nostrils"	At home
			757†	m.	10	...	...	8	50	At a party in 539's house 4 days before his rash			
517	m.	9	772	m.	4	2	50	5	57	Rhinitis	Slight peeling on heel	Slept together	At home
772	m.	4	1077	f.	7	2	35	8	48	Desquamating on heels only on discharge. Rhinitis. None on discharge	Desquamation on feet, face broken out through discharge from nose	772 itself a return case. Dip. cases occurred later at this house	...
344	m.	11	799	m.	2	...	38	30	68	It is doubtful whether case 344 had Scarlet Fever on admission.	.. ...	Figures reckoned on the attack Scarlet Fever after admission	At home

Originating Case: Prog. No. O. C.	Originating Case: Sex	Originating Case: Age	Return Case: Prog. No. R. C.	Return Case: Sex	Return Case: Age	Days Between Rash Removal O.C.	Intervals: In Hospital	Intervals: Between Return O. C. and Rash R.C.	Intervals: Between Rashes	Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	Cases at School between Rashes O. and R. C., also Average Number at School
344	(conti	nued)	801	m.	14	...	...	36	74	19 days after admission he had what was either a relapse or a fresh attack of Scarlet Fever	Nil	......	...
			802	m.	6	...	...	36	74	No complications	......	......	...
483	f.	18	820	f.	9	3	45	21	69	Synovitis during residence, not on discharge	Under the doctor for Rheumatism	Slept together. Case 483, M. 4, returned from hospital after Scarlet Fever 63 days before rash of return case	4 cases in last 3 months 790
601	f.	12	838	m.	$\frac{18}{12}$	3	44	2	49	No complications	Appeared to suffer from a cold on the day after discharge. Two days after discharge sneezed frequently, and had a clear discharge from the nose	601 nursed 838	At home
			839	.	3	...	...	4	51	Owing to an outbreak of Measles she was not in a convalescent ward			
659	f.	7	987	f.	$\frac{18}{12}$	1	48	13	62	Nil	Nil	659 said to have been kept away from 987. They were the only two children	At home
711	m.	10	985	m.	5	1	42	10	53	Endocarditis	Nasal discharge in night of return and for five days afterwards	......	At home

Originating Case			Return Case			Days	Intervals			Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
652	f.	8	1004*	m.	$\frac{18}{12}$	1	53	13	67	No hospital note	Discharge from nose two or three days after leaving hospital	652 did not sleep with 1004	At home
653	m.	12	...	...	...	1	53	13	67				
Diphtheria:													
196	f.	6	1025	f.	2	8	15	24	47	Case 196. Agnes probably had Scarlet Fever. She was in an isolation ward for the whole time of her stay in hospital	......	......	At home
561	f.	3	1038	f.	8	...	64	18	82	No hospital note	622 had offensive breath	1039 had rash three days after 1038	Not at school for 34 days before onset
† Overlooked						Peeling of feet 2 days before removal		Rash 1038 peeling	70 after in 622			561, 622, 1038, 1039 all played together, and slept in one bed	
622	f.	8	1039*	f.	4		64	4	70			561 and 622 returned from hospital to another house. They were at a boarding school before	At home
743	m.	6	1055	f.	4	2	46	8	56	Nil	Nil	......	At home
680	m.	5	1057	f.	7	28	63	6	97	Nil	Nose stuffled, difficulty in breathing	Slept together	$\frac{0}{483}$
			1074†	m.	5	...	...	10	101				

* Died   † From another house

Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes	Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	School between Rashes O. and R. C., also Average Number at School
655	m.	5	1093	f.	$\frac{19}{12}$	1	70	14	85	Nephritis, Conjunctivitis	Nasal discharge on the day after he left hospital. Rash on neck and discharge from eyes and ears 15 days after discharge	......	At home
664	m.	3	...	...	...	...	59	24	83	Nephritis and Otorrhœa, Rhinorrhœa	Nasal discharge a few days after he left hospital	......	...
746	m.	3	1131	f.	7	3	67	3	73	No hospital note	746 has at present a sore nose	......	2 in last 3 months–855 At home
			1132	f.	5	...	...	3	73				
			1186†	m.	4	...	...	11	81				
819	m.	8	1136	m.	4	1	40	17	58	Nil	Nil	......	At home
867	f.	4	1154	f.	23	1	46	7	54	Otorrhœa and Rhinorrhœa	Nose running when child brought from hospital	Slept in same bed and nursed	At home
			1239	f.	7	...	...	18	65				
852	f.	6	1171	m.	11	3	52	6	61	Left Otorrhœa before admission—this was present in discharge Arthritis and Albuminuria	No nose or ear discharge	......	$\frac{1}{374}$
			1298*	m.	4	...	...	22	77				
			1386*	m.	1	...	...	34	89				
851	m.	8	1298	m.	4	8	66	8	82	Otitis, Albuminuria, and Rheumatism	Nil	......	...
			1386	m.	1	8	66	20	94				
786	f.	3	1178	f.	$\frac{21}{12}$	...	65	5	70	Otorrhœa	Nil up to time of rash in 1178, but was sick, and vomited about time of rash in 1254	......	At home
			1254	m.	8	...	...	13	78				

* Died. † From another case.

Originating Case			Return Case			Days	Intervals			Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
942	f.	4	1206	f.	3	...	38	8	46	Nil	Nasal discharge from the 3rd to 10th day after discharge	Returned to a different family in another house	At home 2 cases in 3 months–1888
			1207	m.	5	...	...	8	46				
			1208	f.	10	...	...	8	46				
958	m.	5	1214	m.	11	3	43	4	50	No hospital note	Nil	......	$\frac{1}{568}$
			1215	f.	$\frac{21}{12}$	...	...	5	51				
			1344†	f.	8	...	...	21	67				
			1663†	f.	5	...	...	38	84	......	......	2 sisters—the 1st to take ill was an invalid. Both were in daily contact with case 986	...
			1560†	f.	2	...	...	48	94				
986	f.	11	1310	f.	14	1	46	8	55	Nil	Nil	....	$\frac{2}{474}$
719	m.	9	986†	f.	11	3	41	6	50	Nil	Nil	Lived in another house, but saw cases 986 and 1011 every day	..
			1011†	f.									
827	f.	2	1324	m.	10	1	52	28	81	......	......	......	...
856	m.	4	...	...	...	14	73	3	90	Had both nasal discharge and Otorrhœa when he left hospital	Discharges from nose and ears when he left hospital	......	$\frac{3}{543}$
1003	f.	5	1387	f.	3	1	52	11	64	Otitis. No desquamation on leaving hospital	Nasal discharge 5 days after she left hospital. The girl is said to have taken flakes of skin from soles of feet	......	At home
753	f.	4	1391	f.	$\frac{11}{12}$	1	87	17	105	No hospital note	Breaking out on lower lip 12 days after discharge	......	At home

Originating Case			Return Case			Day	Intervals			Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R.C., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
1008	f.	6	1413	f.	8	1	59	5	65	Nil	Returned from hospital suffering from a bad cold in the head	Slept together since return O.C.	$\frac{3}{511}$
1010	f.	7	1439	m.	11	1	62	7	70	No nasal discharge when left hospital. Had intermittent nasal discharge in hospital	Nasal discharge noticed on day of discharge	......	$\frac{3}{573}$
1081	m.	37	1446	m.	6	1	34	21	56	Nil Not sent to convalescent ward owing to outbreak of measles	Nil	......	$\frac{3}{413}$ in last 3 months
1446	m.	6	1954	m.	5	1	51	9	61	Nil	On returning from hospital had a sore on nose and a slight nasal discharge. He had also two sores on the left hand which discharged freely	Swab nasal + 13 days after discharge. Possibility of overlooked cases. M. 10 (brother) sore throat 2 days before rash 1446; f. 12 (sister) had sore throat 3 days after rash 1446. Neither showed other signs of Scarlet Fever	$\frac{0}{413}$
932	f.	10	1458 1470	f. f.	8 2	1 ...	40 ...	43 47	84 88	Nil	Slight nasal discharge on returning from hospital. It lasted a fortnight	Slept alone for 4 weeks, afterwards with 1458 and 1470	$\frac{5}{650}$
1127	m.	3	1503	f.	2	5	43	6	54	Nil	Nil	......	At home

Originating Case			Return Case			Days	Intervals			Complications in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School	
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes					
666	f.	6	1513*	m.	$\frac{9}{12}$	1	138	4	143	Nephritis Left Otorrhœa	Nasal discharge 2 days after came home, and her ears are sore	......	At home	
699	m.	5	1534	f.	6	2	87	51	140	......	Discharge from nose ever since returning home	Great number of cases at Birley Street School	$\frac{21}{1066}$	Excluded from Return Case list because of large number of cases at school and the considerable interval between return 699 and rash of 1534
1166	f.	2	1558	f.	5	2	39	7	48	Nil	Skin peeling from hands	......	At home	
923	m.	7	1576	m.	13	1	61	37	99	Nil	Nil	Slept together 21 days after return—not before that time	$\frac{2}{503}$	
846	f.	17	1617	m.	7	2	35	80	117	?	?	......	$\frac{0}{282}$	Excluded from Return Cases because of long interval between discharge 846 and rash 1617
356	m.	8	1584	f.	4	1	57	150	208	.....	......	.....	At home	Excluded from Return Cases for similar reason to above

Originating Case			Return Case			Days	Intervals						
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes	Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School
771	m.	4	1686*	f.	9	1	116	10	130	Double Otorrhœa Nasal discharge Albuminuria	Ear discharge 3 days after his return and ever since	......	1 in last 3 months
			1687	f.	16	...	...	15	135				
			1688	m.	12	...	...	16	136				
			1728	f.	14	...	...	20	140				
			1729	m.	2	...	...	20	140				
1267	f.	10	1689	m.	9	...	45	6	51	Nasal discharge	Nil	......	$\frac{3}{908}$
250	m.	5	1696	f.	7	1	47	7	55	Nasal discharge on admission	"Scurvy on top lip"	......	$\frac{2}{532}$
1186	m.	4	1703	f.	5	1	58	5	64	No hospital note	Slight discharge from the ear	......	At home
1031	m.	2	1715	f.	4	...	80	15	95	Right Otorrhœa and Albuminuria	Cold—sore nose; no nasal discharge. Scaly spots on lower part of body and legs	Slept in same room, not in same bed. Played all day together	School outside Manchester
1248	m.	12	1756	m.	6	...	47	15	62	Nil	Nil	Slept in same room as Albert. a suspicious case which occurred at home at time of onset in 1248. He, however, was not notified as Scarlet Fever, but was said to have inflammation of the lungs. Case 1756 took ill within a week of recommencing to sleep with Albert	$\frac{4}{543}$

* Died.

Originating Case			Return Case			Days	Intervals			Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. O., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
1328	m.	11	1765	f.	9	1	44	9	54	Otorrhœa	Nasal discharge started 2 days after he left hospital	Slept in same room	$\frac{0}{1179}$
1344	f.	8	1805	f.	3	1	48	5	54	Otorrhœa	Nil	For four nights slept with her mother: after that in the same room as 1805. 1344 supposed to be a Return Case from another house.	At home
†933	m.	9	1809	f.	12	2	42	81	125	......	......	A great number of cases at school	$\frac{7}{1052}$
1299	m.	3	1894	m.	$\frac{13}{12}$	1	65	6	72	Nasal and aural discharge	Abundant discharge from the nose for 7 days, including the day of return	......	At home
1468	f.	6	1905	m.	9	0	46	3	49	Note on discharge—Right nostril a little sore. Scalp scurvy, no other desquamation	Nil	......	$\frac{0}{190}$
1329	f.	12	1917 1933	f. m.	10 6	... 0	... 43	29 27	72 70	...... Nil	...... Nil	....	... $\frac{0}{286}$
1568	m.	$\frac{9}{12}$	1931 1953 1932*	f. m. f.	13 7 10	1	36	5 8 5	42 45 42	Nil	Nil	Owing to an outbreak of varicella in acute ward he was not sent to convalescent ward	0 cases in last three months, 181 · 1 in last three months, 350

Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C. D	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes	Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	School between Rashes O. and R. C., also Average Number at School
1346	m.	2	...	f.	...	1	62	13	76	?	?	1345 a doubtful case nursed at home. Rash 88 days before that of R.C. R.C. is a lodger	
1347	f.	5	1977	f.	5	0	58	17	75	No Otorrhœa, chronic eczema of scalp	Discharge from nose, starting during the week after discharge; also sore behind ear	......	$\frac{1}{747}$
1348	m.	6	...	...	...	0	44	31	75	?	?	......	...
1381	f.	9	2020	f.	15	2	67	8	77	Otitis, Rhinitis	Nil	......	Not at school
1435	f.	8	2027	f.	$\frac{10}{12}$	0	64	7	71	Otorrhœa	Nil	......	At home
1450	f.	25	2035*	f.	3	1	44	21	66	Nil	Nil	......	At home
1455	f.	4	2038	m.	10	1	47	24	72	No hospital note	On returning home had crack at right corner lip, which has now developed into a sore	......	$\frac{7}{1009}$
1604	f.	7	2044	f.	5	4	44	8	56	Coexistent Scarlet Fever and Diphtheria on admission. No complication	Discharge from nose 2 days after left Hospital	1605 still in hospital. Rash 2 days after that of 1604	$\frac{0}{167}$
1641	f.	8	2045 2046†	f. f.	11 7	0 ...	40 ...	13 13	53 53	Nil	Discharge from nose the day after return home	F. 4 had sickness and sore throat commencing 10 days before rash in 1641	$\frac{13}{1066}$

* Died. † From another house.

Originating Case			Return Case			Days	Intervals			Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
1499	m.	5	2056 2057 2096	m. m. f.	3 $\frac{11}{12}$ 31	0	42	26 29 33	68 71 74	Nil	Sore nose one week about a week after his return from Hospital. This got better. It started afresh 29 days after discharge	......	At home
Fever hospital at seaside resort	m.	7	2063	m.	7	...	42	14	58?	?	Was discharged before desquamation had finished, and has not been well since	......	At home
1521	m.	4	2004	f.	$\frac{20}{12}$	2	40	16	58	No discharge the day before he left, and nothing was noticed when he did leave	Cold and discharge (blood stained) from nose since return home	......	At home
1720	f.	7	2107 2126	f. f.	15 14	13 ...	45 ...	6 14	64 72	Nothing abnormal on discharge, no complications during residence	3 days after left hospital aunt showed mother patient's blistered hands, said to have been burnt one fortnight before she left hospital. Mother pricked superficial abcesses, which contained dark-coloured pus. 3 days after discharge mother noticed small sore under nose.	On discharge taken to the house of case 2107. Later taken home before onset in sister, case 2126	At home Not at school

Originating Case			Return Case			Days	Intervals			Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No of Cases at School between Rashes O. and R. C., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
1444	f.	3	2119	m.	2	1	52	35	87	Note on discharge—Nose slightly sore, no nasal discharge	Slight ear discharge noticed on evening of discharge	Slept together	At home
1719	f.	6	2131	f.	2	1	52	7	60	Nil	Nil	......	At home
1408	f.	8	2138	f.	3	2	89	6	97	No hospital note	Nil	......	At home
1789	f.	11	2144	m.	16	0	48	7	55	Nil	Nil	......	Not at school
Diphtheria case which contracted Scarlet Fever in Hospital	m.	6	15/04	f.	6	Contracted Sc. F. in hospital	61 After Sc. Rash	6	67	Otorrhœa. After contracted Scarlet Fever	Nothing mentioned	Played together. Slept in different rooms	2 in last 3 months 683
2036/03	f.	$\frac{18}{12}$	286/04	f.	9	...	48	33	81	Otorrhœa and Rhinitis	Ear discharge in both cases since return from hospital	Did not sleep in same bed	2 in last 3 months 486
2039/03	f.	4	...	...	...	...	68	12	80	Otorrhœa	......	......	...
350	m.	8	661	f.	5	1	39	22	62	Nil	?	......	2 in last 3 months 530
1480	f.	17–12	....	...	...	2	...	...	63	......	......	......	
1520	f.	6	2010	m.	4	1	43	15	59	......	......	......	? 511
1519	f.	9	...	...	...	11	40	18	69	......	......	......	
1286	f.	5	2022	f.	4	3	130	...	...	......	......	......	...

Originating Case			Return Case			Days	Intervals						
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes	Complication in Hospital	State on discharge and subsequent complications as stated by friends	Remarks	No. of Cases at School between Rashes O. and R. C., also Average Number at School
1306	f.	7	...	...	...	...	72	14	86	Intermittent nasal discharge	Bad cold, cough, nasal discharge. Nose is still sore. Sore on chin	Bedroom to self	At home
1184	m.	8	1551†	m.	6	1	41	4	46	Nil	Nil	Evidence as to contact quite contradictory. Probably in any case contact was in the open air	...
2102/03	f.	2	250/04†	f.	9	1	50	6	57	Rhinitis	?	Played together	...
2113	f.	8	306†	m.	14	...	55	11	66	Rhinitis	......	2113 and 2114 are brother and sister of 306, who called every day at their house	...
2114	m.	6	...	...	...	...	62	4	66	Chronic Lymphadenitis	Neck glands still swollen	......	...
142	f.	5	566†	f.	2	2	56	19	77	Rhinitis	Has had a slight discharge seven days after left hospital. It lasted for a few days	No history of contact given	...
375	f.	7	770†	f.	2	9	48	36	93	Intermittent Rhinitis	Nasal discharge two days after left hospital and thereafter	No history of contact given	...

† From another house.

Originating Case			Return Case			Days	Interval			Complication in Hospital	*State on discharge and subsequent complications as stated by friends	Remarks	Cases at School between Rashes O. and R. C., also Average Number at School
Prog. No. O. C.	Sex	Age	Prog. No. R. C.	Sex	Age	Between Rash Removal O.C.	In Hospital	Between Return O. C. and Rash R.C.	Between Rashes				
768	m.	5	...	...	...	2	36	11	49	Nil	......	1069 visited 768, 769, and 788 every day for four days before the appearance of the Rash	...
769	m.	2	1068†	f.	19	...	43	4	47	Rhinitis	769 has had discharge from the nostrils	......	...
788	f.	15	...	...	...	1	41	4	46	Nil	......	......	...
1437	m.	4	2032†	m.	4	2	43	29	74	Nil	Nil	Played together in the house	...
Moss Side case	m.	8	2120	m.	5	2	68	13	83	Sores on legs, due to tight garters	Nil	Used same towel	Moss Side School
*282	f.	8	1633	f.	13	2	44	186	232	?	?	......	Not at School
1591	f.	8	2124	m.	10	1	67	4	72	Nil	Yellowish discharge from the nose on discharge	......	$\frac{6}{1339}$
1379	f.	4	1866	f.	$\frac{15}{12}$	3	45	9	57	Nil	Suffered slightly from ear ache. No discharges	Slept by herself. Returned to a new house	At home
504	m.	3	952	m.	5	3	41	42	86	......	Nil	......	...
1327	m.	3	1170	f.	8	1	63	15	...	......	Nil	......	...

* 1633 is excluded from the return cases because of the long interval elapsing between the return 282 and rash 1633. † From another house.

A table is given of the days between return home of the primary case and the rash of the subsequent cases :—

Days	−7	−14	−21	−31	−41	−51	−61	−71	−81	81+	Total
Return Cases	47	38	23	13	11	6	...	...	...	...	138
Subsequent Cases	47	38	23	13	11	7	...	...	2	2	143

Cases classed as return cases would not be so classed if an interval of 24 hours did not elapse between the return of the primary case and the onset in the subsequent case. Therefore, the 47 cases mentioned as occurring in the first week really include the cases occurring within a period of 5 days. In comparing the infective power of discharged cases one would put it for the first three weeks as 66, 38, 23. Comparing the −31, −41, −51 day periods with those of the first three weeks, we have the figures 9, 7, and 4. The infectivity of discharged cases therefore rapidly diminishes.

Duncan Forbes, M.D.

DIPHTHERIA AND MEMBRANOUS CROUP.

The seasonal incidence of Diphtheria varies considerably. Table A, in the first column, gives the percentages of the total number of cases for 12 years, having their onset in any month. The same table shows the varying percentages of cases occurring in any month in any year over a period of six years. The figures for any month vary considerably from each other. November is the only month in which the percentage is over the average in every year.

Table A.

	Average 12 years. 1893–1904.	1898	1899	1900	1901	1902	1903	1904
January.........	8·6	...	10·2	11·6	11·9	8·2	7·0	5·0
February.......	8·1	...	5·5	6·2	10·7	7·3	7·8	8·5
March	9·4	...	6·2	7·2	4·9	11·2	8·4	9·4
April.....	7·4	...	9·7	3·5	6·5	4·9	6·5	5·2
May	6·9	...	6·9	3·3	6·9	6·3	8·8	6·9
June............	7·6	...	4·3	8·9	7·7	4·6	6·5	5·6
July	9·2	8·8	2·4	12·7	10·7	7·9	11·7	...
August	7·4	10·5	8·5	5·4	6·6	6·3	8·0	...
September	8·6	9·0	3·4	5·4	7·7	10·2	11·8	...
October	7·4	5·8	5·9	8·3	9·2	6·3	8·1	...
November	9·7	8·1	13·6	8·1	9·9	9·0	8·0	...
December......	7·7	13·5	14·2	5·9	3·3	6·9	4·1	...

The first column of the table gives the percentage number of 4,680 attacks occurring in each month in 12 years (1893-1904). Average percentage 100 × $\frac{1}{12}$ = 8·3.

The other columns give the percentage of cases occurring in the middle month of each 13 months during 5 years (1898-1903). Average percentage 100 × $\frac{1}{13}$ = 7·7.

The following are the tables relating to Diphtheria and Membranous Croup during the year 1904 :—

DIPHTHERIA, MEMB. CROUP, 1904.—ATTACKS IN WEEKS, ACCORDING TO DATE OF ONSET.

First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Jan. 9	7	April 9	7	July 9	8	Oct. 8	20
,, 16	4	,, 16	3	,, 16	8	,, 15	17
,, 23	9	,, 23	5	,, 23	4	,, 22	7
,, 30	6	,, 30	5	,, 30	5	,, 29	19
Feb. 6	12	May 7	10	Aug. 6	5	Nov. 5	11
,, 13	9	,, 14	8	,, 13	9	,, 12	6
,, 20	13	,, 21	3	,, 20	5	,, 19	16
,, 27	11	,, 28	9	,, 27	3	,, 26	12
Mch. 5	7	June 4	8	Sept. 3	13	Dec. 3	9
,, 12	10	,, 11	9	,, 10	12	,, 10	12
,, 19	12	,, 18	6	,, 17	12	,, 17	17
,, 26	12	,, 25	5	,, 24	10	,, 24	10
April 2	15	July 2	4	Oct. 1	9	,, 31	6
Total...	127	Total...	82	Total...	103	Total...	162

City total, 474.

DIPHTHERIA AND MEMB. CROUP ATTACKS, 1904.—RATES PER 1000 LIVING, COMPARED WITH MEAN OF FIVE YEARS.

	1899	1900	1901	1902	1903	Mean	1904
Twelve Notification Towns ...	2·06	1·89	1·67	1·51	1·20	**1·67**	1·35
City of Manchester	0·45	0·62	0·84	0·77	1·12	**0·76**	0·85
Manchester Township........	0·31	0·34	0·58	0·61	0·54	**0·48**	0·59
North Manchester	0·81	1·14	1·10	0·78	1·32	**1·03**	0·95
South Manchester	0·33	0·44	0·79	0·84	1·28	**0·74**	0·91

DIPHTHERIA, MEMB. CROUP, 1904.—NUMBER OF ATTACKS, OF DEATHS, AND CASE FATALITY AT DIFFERENT AGES, FOR THE TEN YEARS 1894-1903. AND FOR 1904.

	1894-1903			1904		
AGES	ATTACKS	DEATHS	CASE FATALITY*	ATTACKS	DEATHS	CASE FATALITY*
Under one year ...	108	75	69·4	17	6	35·3
1 to 2 years ...	299	169	56·5	38	18	47·4
2 to 3 ,, ...	321	154	48·0	33	15	45·4
3 to 4 ,, ...	409	159	38·9	52	13	25·0
4 to 5 ,, ...	384	138	35·9	51	11	21·6
5 to 6 ,, ...	328	104	31·7	44	13	29·5
6 to 7 ,, ...	214	60	28·0	44	5	11·4
7 to 8 ,, ...	196	44	22·5	32	3	9·4
8 to 9 ,, ...	153	32	20·9	28	4	14·3
9 to 10 ,, ...	123	15	12·2	21	3	14·3
10 to 15 ,, ...	354	26	7·3	49	6	12·2
15 to 20 ,, ...	186	8	4·3	15	1	6·7
20 to 25 ,, ...	170	5	2·9	12	...	...
25 to 35 ,, ...	210	10	4·8	28	...	...
35 to 45 ,, ...	83	4	4·8	9	...	...
45 to 55 ,, ...	32	2	6·3	1	...	...
55 to 65 ,, ...	7	...	...	...	...	...
Over 65 ,, ...	6	...	...	...	...	...
All ages	3583	1005	28·0	474	98	20·7

* The percentages in this column are the actual proportions of fatal cases to the attacks at those ages.

Diphtheria and Membranous Croup, 1904.—Attacks in Districts, with Attack Rate, Case Fatality per cent., and Removals to Hospital per cent.

Districts	Attacks	Attack Rate per 1000 living	† Case Fatality per cent.	Removals to Hospital per cent.
Ancoats	29	0·66	24·2	62·1
Central	8	0·29	12·5	87·5
St. George's	40	0·68	20·0	62·5
Cheetham	59	1·49	25·4	50·8
Crumpsall	8	0·88	...	37·5
Blackley	9	0·97	...	66·7
Harpurhey	12	0·64	8·3	41·7
Moston	12	0·78	25·0	25·0
Newton Heath	39	1·04	25·6	56·4
Bradford	19	0·77	31·6	57·9
Beswick	4	0·33	25·0	75·0
Clayton	7	0·66	28·6	71·4
Ardwick	34	0·79	14·7	32·4
Openshaw	24	0·85	25·0	37·5
Gorton (West)	19	0·62	10·5	52·6
Rusholme and Kirk.	36	1·39	22·2	19·4
Chorlton-on-Medlock	44	0·77	18·2	54·5
Hulme	71	1·08	21·1	50·7
City of Manchester	**474**	**0·85**	**20·7**	**49·6**

† Corrected: the fatal cases are those actually occurring amongst the cases notified.

Diphtheria, Memb. Croup Mortality, 1904.—Rate per 1000 living compared with mean of five years.

	1899	1900	1901	1902	1903	Mean	1904
England and Wales	0·29	0·27	0·27	0·23	0·18	**0·25**	0·17
*76 Great Towns	0·40	0·35	0·30	0·26	0·20	**0·30**	0·19
London	0·43	0·34	0·30	0·25	0·16	**0·30**	0·16
Manchester City	0·16	0·19	0·24	0·22	0·25	**0·21**	0·18
Manchester Township	0·12	0·18	0·16	0·19	0·16	**0·16**	0·13
North Manchester	0·26	0·23	0·30	0·21	0·26	**0·25**	0·22
South Manchester	0·11	0·16	0·25	0·25	0·28	**0·21**	0·17
*142 Smaller Towns	0·28	0·29	0·28	0·24	0·16	**0·25**	0·16
Rural Districts	0·21	0·23	0·24	0·20	0·17	**0·21**	0·14

* The rates for 1901 and previous years are for the 33 Great Towns and 67 Smaller Towns; and for 1902 and 1903, 103 Smaller Towns.

The table comparing the incidence rates of Diphtheria in the Twelve Notification Towns with that in Manchester shows that although the rate in Manchester keeps steadily below that of the Notification Towns its tendency in recent years has been to increase steadily. From an incidence rate of 0·29 in 1897 there was a rise to 0·84 in 1901, and in 1903 it reached 1·12. During 1904 it has dropped back to 0·85.

The table showing the Case Fatality gives 28·0 per cent. of deaths in the 10 years preceding 1904. During the present year the figure is 20·7 per cent. This is still a very high Case Fatality. No one disputes the efficacy of antitoxin if it is administered early in cases of Diphtheria. In children no bad effects have been observed to follow its administration. If the medical practitioner is in doubt he should give antitoxin. He should certainly not await the result of the swab before applying the remedy. If, after the child has had antitoxin, the swab is returned negative no harm has been done, and the safe course has been followed. Antitoxin* and a syringe can be obtained from the Public Health Office, or the Police Department, Town Hall, when the former is closed. Antitoxin can be given with the ordinary hypodermic syringe. In that case, after a syringeful has been injected, detach the syringe, leaving the needle imbedded in the skin, and use a second needle to withdraw more antitoxin from the bottle. If the practitioner is unaided, it is well for him to place very young patients or very nervous patients face downwards, and inject between the scapulæ. In this position they can most easily be controlled.

If the doctor does not within a few hours of seeing children suffering from sore throat without eruption, in whom exudate or membrane is present, either administer antitoxin or go to the nearest Police Station and telephone to the Public Health Office (if this is closed, to the Cleansing Department, Oldham Road) and notify, in order that the case may at once be removed to hospital, he may be directly responsible for the death of the child.

The table dealing with attacks in districts gives the highest attack-rates in Cheetham, Rusholme, Hulme, and Blackley. Crumpsall, Hulme, and Cheetham had the highest attack-rate in 1903.

Diphtheria in Schools.

It is sometimes desirable to ascertain the prevalence of Diphtheria bacilli, and, therefore, presumably of diphtherial infection, apart from the occurrence of actual cases. On the 12th December, therefore, Dr. A. B. Ritchie, Medical Officer for the Education Committee, obtained swabs from 24 scholars (aged 12–13) and from a teacher at a school from which the

* 89 applications for antitoxin were made. 420,000 units were given out.

last known case of Diphtheria was notified in September, 1903. Three of these gave positive results. These scholars were all apparently in good health.

Dr. Ritchie also took swabs from 17 children (ages between 10 and 11 years) and one teacher at a higher grade school. In one of these a few suspicious bacilli were found. The last case at this school was reported in June, 1903.

In Mill Street Industrial School 9 cases occurred on the following dates :—
November 9th, 11th, 18th, 19th, 21st, 24th, and 30th.
December 2nd, 4th.

In St. Edmund's School odd cases have occurred at varying intervals :—
February 7th, 11th, 12th.
March 30th.
April 26th.
September 2nd.
October 16th, 27th, and 28th.
November 17th.
In Birley Street a small outbreak occurred in November, also :
February 24th.
September 27th (?).
October 18th.
November 11th, 11th, 15th, 28th, 28th.

Active measures were taken in the case of the Mill Street Industrial School. Sixty-three swabs were taken giving, positive results in 8, negative in 51, and doubtful in 4.

The houses from which the children came are very poor. Children with sore throat were separated from the others, but continued to attend school. Local treatment was carried out by Dr. Ritchie.

DUNCAN FORBES, M.D.

ENTERIC FEVER.

In 1904 there were 325 cases of Enteric Fever reported.

From Table 3 it will be seen that the attack-rate is 0·58, compared with a mean attack-rate of 0·69 for the previous five years. This rate compares favourably with that of the 12 notification towns, which is 0·71.

Table 6.—The death-rate is 0·12, which is higher by 0·03 than that for England and Wales for the previous five years, but is lower than the average for the same years in Manchester, which is 0·02.

Table 5.—The case fatality is 18·8 per cent. The table of case fatality for the eight years 1897-1904 deals with 3,353 cases. From a table treating of such a large number of cases an approximate idea should be gained, not only of liability to death on attack at a given age, but also of the liability to attack at different ages. During the first five years of life the case mortality is 10 per cent. Thereafter it is most convenient to collect the remaining age groups into four divisions, in which the various group case fatality percentages approximate to each other.

5—15	Case Fatality,	11·1	per cent.	
15—35	Do	20·1	,,	,,
35—55	Do.	29·0	,,	,,
Over 55	Do.	42·3	,,	,,

The greatest liability to attack is at the age period of 15-20. The liability decreases rapidly as one passes to younger, but more slowly towards older ages.

The following are the tables referring to this disease :—

I.—Enteric Fever Attacks Reported in Quarters.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1891	173	119	180	289
1892	164	106	156	184
1893	108	80	220	210
1894	118	75	135	132
1895	110	90	100	193
1896	118	130	108	157
1897	97	57	137	212
1898	143	79	134	286
1899	101	66	104	110
1900	85	78	103	112
1901	43	43	149	124
1902	63	82	111	122
1903	90	82	87	128
1904	69	68	105	83

2.—Enteric Fever Attacks in weeks reported in 1904, according to date of onset.

First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Jan. 9	3	Apl. 9	7	July 9	3	Oct. 8	7
„ 16	5	„ 16	3	„ 16	3	„ 15	7
„ 23	9	„ 23	10	„ 23	6	„ 22	4
„ 30	11	„ 30	10	„ 30	6	„ 29	7
Feb. 6	1	May 7	6	Aug. 6	9	Nov. 5	9
„ 13	3	„ 14	5	„ 13	8	„ 12	5
„ 20	5	„ 21	6	„ 20	7	„ 19	7
„ 27	3	„ 28	2	„ 27	9	„ 26	6
Mch. 5	6	June 4	4	Sept. 3	6	Dec. 3	6
„ 12	8	„ 11	3	„ 10	10	„ 10	5
„ 19	4	„ 18	3	„ 17	13	„ 17	7
„ 26	4	„ 25	7	„ 24	7	„ 24	12
April 2	7	July 2	2	Oct. 1	18	„ 31	1
Total...	69	Total...	68	Total...	105	Total...	83

City Total 325

3.—Enteric Fever Attacks, 1904.—Rates per 1000 living, compared with mean of five years.

	1899	1900	1901	1902	1903	Mean	1904
Twelve Notification Towns...	1·60	1 12	1·26	1·01	0·81	**1·16**	0·71
City of Manchester.........	0·70	0·70	c·66	0·69	0·70	**0·69**	0·58
Manchester Township.........	0·77	0·65	0·65	0·80	0·77	**0·73**	0·82
North Manchester	0·73	0·80	0·77	0·85	0·59	**0·75**	0·56
South Manchester	0·64	0·65	0·58	0·52	0·73	**0·62**	0·47

4.—Enteric Fever, 1904.—Number of Attacks in Districts, with Attack Rate, Case Fatality per cent., and Removals to Hospital per cent.

Districts	Attacks	Attack Rate per 1,000 living	† Case Fatality per cent.	Removals to Hospital per cent.
Ancoats	26	0·59	19·2	57·7
Central	10	0·36	30·0	80·0
St. George's	71	1·21	15·5	78·9
Cheetham	18	0·46	11·1	61·1
Crumpsall	6	0·66	33·3	66·7
Blackley	5	0·54	40·0	40·0
Harpurhey	13	0·69	...	30·8
Moston	2	0·13	50·0	50·0
Newton Heath	24	0·64	25·0	58·3
Bradford	16	0·65	12·5	68·7
Beswick	11	0·91	45·5	81·8
Clayton	5	0·47	...	20·0
Ardwick	10	0·23	30·0	80·0
Openshaw	16	0·57	25·0	81·2
Gorton (West)	21	0·68	...	71·4
Rusholme and Kirk...	7	0·27	14·3	85·7
Chorlton-on-Medlock	18	0·32	27·8	61·1
Hulme	46	0·70	19·6	71·7
City of Manchester	325	0·58	18·8	68·3

† Corrected; the fatal cases are those actually occurring amongst the cases notified.

5.—Enteric Fever.—Number of Attacks, of Deaths, and Case Fatality per cent. at Different Ages, for the Eight Years 1897–1904, and for 1904.

Ages	1897-1904			1904		
	Attacks	Deaths	Case Fatality per cent.	Attacks	Deaths	Case Fatality per cent.
Under one year	2	1	50·0	...	...	...
1 to 2 years	11	2	18·2	1	...	...
2 to 3 ,,	30	3	10·0	3	1	33·3
3 to 4 ,,	52	4	7·7	4	1	25·0
4 to 5 ,,	64	6	9·4	5	1	20·0
5 to 6 ,,	78	8	10·3	3	...	...
6 to 7 ,,	77	8	10·4	6	...	...
7 to 8 ,,	78	6	7·7	9	...	...
8 to 9 ,,	86	11	12·8	12	2	16·7
9 to 10 ,,	68	6	8·8	6	1	16·7
10 to 15 ,,	452	54	11·9	41	3	7·3
15 to 20 ,,	518	91	17·5	45	10	22·2
20 to 25 ,,	566	125	22·1	54	10	18·5
25 to 35 ,,	753	154	20·4	75	10	13·3
35 to 45 ,,	328	91	27·7	39	13	33·3
45 to 55 ,,	138	44	31·9	17	6	35·3
55 to 65 ,,	43	17	39·5	4	3	75·0
Over 65 ,,	9	5	55·6	1	...	...
All ages	3353	636	19·0	325	61	18·8

6.—Enteric Fever Mortality, 1904. Rate per 1000 living, compared with mean of five years.

	1899	1900	1901	1902	1903	Mean	1904
England and Wales	0·20	0·16	0·16	0·13	0·10	**0·15**	0·09
London	0·18	0·17	0·12	0·13	0·09	**0·14**	0·06
Dublin	0·55	0·38	0·32	0·33	0·24	**0·36**	0·19
City of Manchester	0·13	0·14	0·14	0·12	0·17	**0·14**	0·12
Manchester Township	0·15	0·14	0·16	0·12	0·16	**0·15**	0·15
North Manchester	0·11	0·14	0·13	0·11	0·15	**0·13**	0·11
South Manchester	0·14	0·14	0·13	0·12	0·18	**0·14**	0·11

It is by no means an easy matter to account for the manner in which Enteric Fever continues to crop up in different parts of a city like Manchester, with an apparent independence of locality, or of any known antecedents. There is, certainly, some tendency towards a decrease, but it is gradual in its action, and also uncertain.

If we are made acquainted with all the attacks which occur, it would seem as if the precautions taken ought to cause a diminution in the number of cases, unless there is a perpetual re-introduction of the disease.

Apart from the diminution of Enteric Fever itself, it is probable that any light which is thrown on its modes of propagation will help to elucidate the Diarrhœal group of diseases generally.

To advance further in its prevention, it appears to be necessary that we should give additional study to the facts of infection.

In making such a study of the materials at our disposal, it is necessary to premise that any conclusions drawn from the details will strictly be applicable to Manchester alone. There is nothing more striking in the history of Enteric Fever than the extensive and destructive outbursts which have attended the consumption of infected water supplies. If, then, we should conclude that the water supply in Manchester has not been responsible for the spread of Enteric Fever in recent times, that conclusion reflects no doubt on the importance of the water supply elsewhere in connection with the production of Enteric Fever, and possibly of other fevers. Nor does it preclude the occurrence of water-borne Enteric in Manchester, should specially unfavourable conditions arise.

What we are concerned to know, if possible, is, what is the usual course and causes of the occurrence of Enteric Fever in Manchester?

Such an enquiry can only be conducted on the facts available, and it will be convenient to arrange these so as to bring out:

(1) The facts bearing on what may be called the direct transmission of the disease from one person to another. In most instances there has been personal contact, in others the infection has been carried by some intermediate person. In still others the infected person has been present in a grossly infected place. In this group, generally, there is no proof that the disease has been carried in food, though such mode of transmission is, usually, probable.

(2) The facts bearing on transmission by the water supply.

(3) The facts relating to milk.

(4) The facts recorded in respect of shellfish.

(5) Any facts respecting other foods.

(6) Facts relating to occupation.

(7) Any special problem, and general conclusions.

1.—Direct Transmission.

In this class of cases one would include instances in which persons with ambulant typhoid, or wearing clothes saturated with infection from intimate contact with a case of Enteric Fever, conveyed the disease to others by the use of a common closet or otherwise. It is most remarkable how rare are cases illustrating the latter mode of transmission. It cannot be that conveyance by contacts does not take place. In the course of an investigation into the occurrence of two limited outbreaks in institutions—one in Oldham, and one in Manchester—I came to the conclusion that the disease had been transmitted in the closet, and in the case of two other institutions this was a possible explanation of limited incidences.

Two explanations are possible of our failure to establish such histories. One is that the disease is probably often concealed altogether by workpeople, when it is present in its slighter forms, so that the infecting person is never discovered. The other is that our investigations are not sufficiently persistent and exhaustive. It is probable that the former is the more frequent cause.

During last year two persons—one a baker, another a fruit sorter—passed through the entire course of fairly severe attacks, going to work all the time, and resolutely refraining from seeking medical assistance.

One has also, not rarely, had the impression that previous attacks in a house have been concealed.

The degree to which known cases in an infective condition have pursued their callings will be further considered, and it will be seen that the danger is no slight one. What applies, however, to the initiating case applies also to the subsequent ones, and cases occurring in consequence of these have, no doubt, been overlooked or concealed.

It is inconceivable that the numerous contacts with cases of Enteric Fever should not have given rise to attacks in others. Yet in only three instances in 1904 have we positive evidence of this occurrence, and two of these were relatives of the infected persons.

The modes in which persons suffering from overlooked attacks and persons in intimate contact with cases can give rise to other cases outside the house will be subsequently considered. It is sufficient, at present, to say that the investigations made do not reveal directly such modes of transmission, except to a trifling extent. The histories are, mostly, of domestic infection.

In previous years these have been given at length, in order to emphasise the important part played by direct infection in the continuance of the disease.

It has appeared worth while to record them at length, as the view that Enteric Fever is not directly transmissible, or at least not easily or frequently, has diminished the vigilance and weakened the precautions taken by the medical attendants and people.

A no less unhappy influence has been exerted by the habit of regarding Enteric Fever as a severe disease. It is probable that Enteric Fever is very frequently of the slightest character.

Not only so, but it has the habit of simulating many other diseases such as Influenza, Bronchitis, Pneumonia, Tuberculosis, Diarrhœa, and indefinite febrile illnesses.

It is a question whether Enteric Fever is not often introduced by the respiratory passages, and I have been inclined to think that this was so, but without being able to produce proof further than that an attack is not rarely introduced by Pneumonia.

Two observations by Dr. Gordon go far to confirm this view. These were cases of Diphtheria in which the course of the temperature subsequently suggested the possibility of Enteric Fever having supervened. These patients had Paralysis of the Diaphragm and Broncho Pneumonia following Diphtheria, but the usual signs of Enteric Fever were absent. The serum test gave a $+^{ve}$ reaction.

In one of them, post-mortem examination failed to show Enteric lesions in the bowel, and the spleen was small, but pure cultures of the bacillus were readily obtained from it by Prof. Delépine. In this case the disease appeared to start as a Broncho Pneumonia.

Enteric Fever may, however, simulate Diphtheria in the early, and even Scarlet Fever in the later stage.

In 1904 it has been possible, with the aid of Mr. Hewitt (one of the Inspectors appointed to assist the Medical Officer of Health), to investigate more fully many of the cases occurring in the latter part of 1904. His excellent and careful work has been of great service.

This is not said by way of depreciating the work of the District Inspectors, who have not the time necessary to train themselves in special lines of investigation, or to carry out such enquiries. Moreover, the enquiries vary considerably in value, and in some cases need to be supplemented.

The total number of cases notified during 1904 was 344. Of these, however, 11 were certainly and 14 were probably not cases of Enteric Fever. The following observations relate to the remaining 319 cases.

The histories of direct transmission in 1904 are given at the end of this section.

They may be classified as follows :—

	Evidence of direct infection cases	Direct infection inferred cases	Total cases occurring
First Quarter............	15	10	68
Second ,, ...	12	0	67
Third ,, ...	18	4	103
Fourth ,, ...	30	2	81
	75	16	319

It will be noted that a large number of cases are inferred in the first quarter to have been directly infected. This occurs when two, three, or more cases occur together at intervals too brief for one to have infected the others, but without the first case having been discovered. The great merit of the work in the last quarter lies in its having reduced the number of such cases. It is, also, however, notable that they do not occur in the second quarter.

Still, there is no doubt that sufficient enquiry in the first quarter would have diminished the large number occurring then.

It thus appears that, over the whole year, the number traceable to direct infection is between one-third and one-fourth of the total number of cases.

Influence of overlooked cases.

Attention may be more particularly directed to the very great importance of overlooked cases in spreading Enteric Fever.

The number of houses in which persons lived who are believed to have been infected by what may be called "direct transmission" was 56.

The cases resulting may be classified as follows :—Contracted from a person living in the same house, and a member of the same family, 68; from a person living in the same house, but not a member of the family, 5; contracted outside, or in another house, or introduced by a case or contact from another house, 17. Total number of infected cases, 90.

Of the infecting persons in the above series 26 were overlooked, of whom nine were proved to have Enteric Fever by the serum test, in eight others the test was not applied, but they may be taken to have had the disease. In eight instances the existence of an infecting case is assumed. In one instance the infection relates to a subsequent case. Of the nine overlooked cases proved by the serum test to have had Enteric Fever, one (case 246) was, for some time, believed to be suffering from Consumption, and cases 341 and 309 were supposed, no doubt, to be suffering from Diarrhœa. In the bulk of the cases, however, there appears to be no reason why they should not have been recognised earlier by the family or by the medical attendant.

These nine clearly ascertained overlooked cases gave rise to 30 subsequent cases.

Case 246 lived in a back-to-back house, and the people were wretchedly poor. He was taken ill about August 13th, and removed to Crumpsall on August 25th, supposed to be suffering from Consumption. His attack was inferred by me on a visit to the house, and the serum test showed that he was suffering from Enteric Fever. He infected four members of the family and two companions.

Case 287, a fruit sorter, would not consult a medical man. There were 17 persons living in five rooms in the house. His attack was well marked, and he had copious Diarrhœa. He continued at work the whole time, and infected five persons in the same house. It was not possible to trace the persons who consumed the fruit handled by him.

Case 341, a child of six, began with copious Diarrhœa, and infected five persons in the same house. These people were very poor.

Case 309 began with Diarrhœa, and infected three others in the same family. These persons also were very poor. The father and mother were not notified, nor could the medical attendant take a sample of blood for examination. Their attack was inferred.

It is scarce possible to suppose that these persons failed to infect others outside their own household.

From the eight infecting cases who were overlooked, and whose illnesses were inferred to be Typhoid, there were probably infected 10 others. Of the eight infecting, one was believed to be suffering from Pneumonia, three from Diarrhœa, and one from Influenza. In case 239, I believe the attack to have been deliberately concealed by the woman who nursed the unreported case, and who herself contracted the disease. In case 200, it is possible that the wife concealed the attack, not a severe one, in her husband, who infected her. In 328, it is difficult to avoid the belief that the medical attendant deliberately avoided notifying the case, from which the subsequent case arose.

It is such cases as these that give strength to the conviction that many attacks in workers, especially slighter ones, are suppressed altogether.

In eight instances the previous attack is assumed, though no previous case was shown to have had Enteric.

It may be stated that, where two cases in one house begin nearly at the same time, there is a high degree of probability that a previous attack has been overlooked. Where three such cases occur, it is practically certain. This is given as the result of investigation, and is in no sense theoretical. Hence there is probably deficient investigation in five cases. In one of these the head of the house opposed further investigation. The four others are in the earlier part of the year. In three instances the inference is not formed on the above basis. The number of subsequent cases thus explained is 15.

A subsequent overlooked attack of Diarrhœa in a child æt. 1½ occurs after case 28.

In all, 55 cases, or over one-fifth of the total, are traced to overlooked or concealed attacks, as ascertained or inferred.

Enteric Fever cloaked by Diarrhœa.

Of the overlooked attacks, six suffered from Diarrhœa; but this by no means represents the part which Diarrhœa plays in cloaking Enteric Fever. These are only cases entirely or practically entirely overlooked. There are many others in which the attack was taken for a time to be simply one of Diarrhœa.

Conveyance of Contacts.

In two cases—viz.: 230 and 300—the disease was probably conveyed from one house to another by a person in contact with a case of Enteric Fever, but not herself suffering, while the same mode of transference may be true of case 74.

The following is a history of the facts ascertained relative to Direct Infection :—

No. of Case	Re-action	Sex	Age	Relation of Infector	Degree of intimacy and duration	Date of attack of case	Remarks	District
3	+	m.	26	?	Infected in Bradford, Yorkshire. A boy was taken ill at the same time in the house where he lodged	December 22nd, 1903	......	Chorlton-upon-Medlock
5	?	f.	27	Brother	Patient attended to her brother while suffering from Enteric Fever up to December 14th	December 29th, 1903	......	Newton
14	+	m.	8	Brother +	Brother commenced to be ill December 18th. Removed to Monsall Hospital January 18th. Slept some time in the same room with his brother	January 6th	......	Beswick
16	+	m.	9	A friend +	Mrs. F. (case 7), visited here on December 24th from 3, Alfred Street, said to have taken ill December 31st	January 3rd	School (St. Patrick's)	St. George's
17	+	m.	20	Brother	Brother onset December 25th, removed to hospital January 9th	January 16th	The brothers have partaken of the same food	Hulme
21	+	m.	12	Scholar same school see 16 +	Playmate of 16. Has also visited the house of Mrs. F. (case 7)	January 16th	School (St. Patrick's)	St. George's
22	+	f.	14	?	....	January 19th	......	Ancoats
23	+	f.	35	?	Mother to 22	January 20th	Clearly a previous case here	......
24	+	m.	12	?	Brother to 22	January 24th	......	......
28	+	m.	20	Lodger	This patient is a lodger. A child (æt $1\frac{1}{2}$) is now suffering from Diarrhœa, February, 1904. Serum reaction negative	January 20th	Subsequent case to 28 (?)	St. George's
36	+	f.	54	Friend +	Frequently visited at the house of case 7, who was removed to hospital on January 13th (Mrs. F.)	January 28th	......	St. George's

No. of Case	Re-action	Sex	Age	Relation of Infector	Degree of intimacy and duration	Date of attack of case	Remarks	District
38	+	m.	4	Father +	Father removed to hospital on January 2nd. House disinfected January 4th	January 25th	......	Crumpsall
58	+	m.	21	Brother 52 +	Brother took ill February 16th, removed to hospital March 2nd	March 5th	Brother a Scholar at St. Patrick's	St. George's
61	+	m.	30	Daughter ? No specimen	Daughter (æt. 4) is recovering from an attack of pneumonia. No specimen taken	March 6th	......	Hulme
65	+	m.	19	From friend 45, 48, 49, at another house	The first two cases have clearly been infected from a common source. 67 may have been infected from 65 and 66. These patients were intimate with a family in Poplar Street, from which 3 cases were removed to hospital on March 1st. 45, 48, 49 below	March 5th	Report incomplete	St. George's
66	+	m.	15			March 8th		
67	+	m.	13			March 19th		
74	+	m.	40	??	This was a lodger in a common lodging-house opposite the house occupied by 65, 66, and 67. It is suggested either that the father of these 3 cases had Enteric or carried it in his clothes, and gave it to case 74	March 25th	......	St. George's
79	+	f.	34	Person nursed (?)	Patient has just been nursing a patient suffering from Cancer and Diarrhœa	March 1st	Nature of illness of case nursed was not ascertained	St. George's
92	+	m.	7	?	It is probable that there was some previous overlooked case here; but no case was ascertained	April 1st	......	Chorlton-upon-Medlock
111	+	f.	13			March 31st		
45	+	f.	12	Mother of case 49 seized with Diarrhœa on January 30th. No test made	After partaking of boiled fish on January 30th the mother of these children, and cases 45 and 49, were taken ill with Diarrhœa. The mother recovered after 4 or 5 days. Case 45 recovered and began again on February 16th. Case 49 continued ill all the time	February 16th	It is probable that the boiled fish was only an interlude, and that there had been a case previous to 49 and her mother	Ancoats
48	+	m.	9			February 26th		
49	+	f.	8			January 30th		

No. of Case	Re-action	Sex	Age	Relation of Infector	Degree of intimacy and duration	Date of attack of case	Remarks	District
101	+	f.	32	......	The date of onset of case 101 is doubtful. It was, however, a few days prior to her confinement on April 21st. If these dates are correct there must have been a previous case in the house, and this case must have been a child.	April 16th ?	The drains were taken up at the next house but one prior to the illness of case 101, and next door to case 118	St. George's
102	+	f.	7	Daughter		April 19th ?		
103	+ ?	m.	10	Son		April 28th		
109	+	f.	22	Housewife +	This patient was a lodger in the house of cases 101 to 103. She cleaned up the house after returning from work. Had eaten only one orange from the sick room	May 3rd	......	......
118	+	m.	3	From next door To 101-103	This child had probably been in the above house, and eaten food there	May 9th	......	......
132	+	m.	35	Wife and children + + +	From above cases 101–103, 109 and 118	May 24th	......	......
119	+	f.	30	Child Not taken	Fred (æt. 2) had Diarrhœa from about April 1st to April 28th. Thomas kept from school, being ill from May 8th to May 13th. No doubt Fred had Enteric Fever	May 5th	No tests were made in these cases apparently, though asked for	Rusholme
136	+	f.	28	Sister, æt. 21. Case 137 overlooked +	Sister began to be ill April 23rd. Lived in the same house	May 15th	......	Rusholme
138	+	m.	11	Brother +	Brother removed to hospital on May 5th. Case 95	May 28th	Possibly an intermediate case. None discovered	Ancoats
145	+ incomplete	f.	5	Mother +	Mother (125) removed to hospital on May 30th. This child slept with her mother	June 11th	......	St. George's

No. of Case	Re-action	Sex	Age	Relation of Infector	Degree of intimacy and duration	Date of attack of case	Remarks	District
146	+ incom-plete	m.	10	Brother, æt. 3, overlooked attack +	Brother, æt. 3, was sick, and had headache and Diarrhœa from about April 1st to April 6th	June 9th	......	Rusholme
151	+ ?	m.	8	Case 150	....	June 16th	......	......
147	+ incom-plete	m.	10	Mother +	Mother removed to hospital June 1st. Brother, æt. 16, is now ill in bed. No further report.	June 22nd	......	Ardwick
168	+	f.	12	?	These children slept in the same bed. No doubt there had been an undiscovered case here	July 18th	......	St. George's
169	+	f.	8			July 22nd	......	
176	+	f.	24	?	The two sisters slept together. The dates of onset, however, strongly suggest the presence in the house of a previous case	July 18th	......	St. George's
179	+	m.	16			July 24th	......	
181	+	f.	27			July 30th	......	
188	+	m.	34	Wife and her Sister + +	Previous cases 136, 137; case 136 has just recovered at home	August 13th	......	Rusholme
190	+	f.	29	Child in same house	Previous case removed to hospital July 20th	August 13th	Intermediate case ?	West Gorton
195	No test	m.	33	A child No test	A child, æt. 3 years, died of Diarrhœa on August 14th	August 28th	......	West Gorton
207	+ Incom-plete	f.	22	Child in 195	Disease contracted from visiting at her brother's house, next door, where a child suffered from Diarrhœa	August 24th	......	West Gorton
209	+	f.	26	Child in 195	Disease contracted from visiting next door on the other side, at the house of 195	August 30th	......	West Gorton

No. of Case	Re-action	Sex	Age	Relation of Infector	Degree of intimacy and duration	Date of attack of case	Remarks	District
218	+ Incom-plete	m.	11	Companion at another house 246 +	This companion was removed to Crumpsall, supposed to be suffering from Consumption. He began to be ill about the beginning of August. It was inferred that he had had Enteric, and the reaction was +. He was removed on August 25th	September 6th	From an overlooked case. 218 visited at the house of 246 daily.	St. George's
200	+	f.	36	Husband Not tested	Her husband had an illness beginning August 3rd. Diarrhœa about August 10th. Was ill many weeks. Probably Enteric	August 13th	Case re-investigated later on	Harpurhey (Mr. H.)
214	+	m.	18	Brother Not tested	Brother, who slept with him, had an illness a week or two before; an influenza cold, headache, and constipation; ill a week	September 3rd	Case re-investigated	Harpurhey H.
222	+	m.	14	Boy in line above not tested	Cases 222 and 214 both played with above case against the midden of case 214	September 8th	Case re-investigated	Harpurhey H.
230	+ Incom-plete	f.	8	Brother ? + Grandmother ?	The brother (182) was removed to hospital on August 17th. This child has also been much in contact with a grandmother who has been nursing a child ill of Enteric	September 17th	Probably the infection here is indirect	Bradford
233	+	m.	8	Companion +	Visited at home of 246; already mentioned as overlooked	September 15th	St. Patrick's School	St. George's
234	+	f.	11	Brother +	Sister at 246	September 14th	......	St. George's
238	+	m.	$1\frac{1}{2}$	Brother +	Brother to 246. No doubt an intermediate case between 246 and 234	September 15th	Intermediate case not discovered	St. George's

No. of Case	Re-action	Sex	Age	Relation of Infector	Degree of intimacy and duration	Date of attack of case	Remarks	District
241	+	m.	3	246, 234, 235 + + +	Brother to the above	September 29th	......	St. George's
273	+	m.	18	Above cases	Brother to above. The above children were starved and neglected	October 18th	......	St. George's
239	+	f.	25	Lodger overlooked No test	A young woman lodger had all the symptoms of Enteric, and was nursed by case 239. She vomited and had diarrhœa for 5 weeks prior to September 2nd, when she left here	September 9th	Re-investigated by Mr. H.	Harpurhey
243	+ incomplete	f.	48	Husband +	Husband removed to hospital May 28th. The wife was infected after his return	September 12th	A greengrocer's shop	West Gorton
259	+	m.	32	Wife of 173 No test	Probably the wife had an attack of Enteric Fever after removal of her husband to Monsall on August 13th, and patient visited her	September 21st	Re-investigated	Harpurhey
272	+	m.	17	From sister in case above No test	But these two may also have contracted the disease at the Salvation Army Barracks, as subsequent cases also appear to have occurred	October 5th	Re-investigated	Harpurhey
275	+ incomplete	f.	18	Sister previously ill + inc.	Sister had a suspicious illness. This young woman visited her on October 5th and 7th. Death of 275 ascribed to summer diarrhœa	October 13th about	Discovered in the course of diarrhœa investigations	Hulme
...	No test see 295	f.	22	Sister-in-law + inc.	The sister-in-law who nursed case 295 took ill in a manner to suggest Enteric Fever	October 30th	Not notified	Hulme

No. of Case	Re-action	Sex	Age	Relation of Infector	Degree of intimacy and duration	Date of attack of case	Remarks	District
277	+	f.	36	Son +	Son (287) began to be ill October 1st. He is a fruit sorter. Refused to seek medical advice	October 18th	Case 287 was inferred from cases 277 and 279	Cheetham
279	+	f.	6	Brother +	Ditto ditto	October 12th	Ditto	Cheetham
283	+	m.	10	Ditto	Ditto ditto	October 11th	Ditto	Cheetham
292	+	m.	19	Tenants + + +	Ditto ditto There are here 17 people in 5 rooms. 287 ate much raw fruit.	November 2nd	Ditto	Cheetham
280	+	f.	30	......	It is probable that there was an over-looked attack here	October 16th	Husband a (tramguard) objected to further investigation	Harpurhey
288	+	f.	4	......	....	October 22nd	......	Harpurhey
281	+	f.	34	A girl whom she was nursing	Has nursed case of Enteric about 5 weeks	October 16th	......	Chorlton-upon-Medlock
291	+	f.	20	Mother Case 277 +	Belongs to the above series 277, 279, 283, 287, 292	November 4th	......	Cheetham
300	— — +	f.	28	Brother now in Salford Hospital	The sister who nursed him was in the habit of visiting here. Last visit November 5th. She has not herself been ill.	November 12th	......	Chorlton-upon-Medlock
307	+	f.	37	Daughter +	Daughter removed to hospital on October 4th; returned home December 2nd	November 1st	No intermediate case found	St. George's

No. of Case	Re-action	Sex	Age	Relation of Infector	Degree of intimacy and duration	Date of attack of case	Remarks	District
303	+	m.	12	Baby next door æt. 15 months ? No test	This baby had a slight attack of Diarrhœa in October, and was under treatment till December 1st, when it was taken to the Clinical Hospital. These two houses have a common closet	November 25th	Baby is now recovering	Ancoats
311	+	m.	23	Wife + (223)	Wife removed to hospital on September 23rd ; returned to her mother's house on October 14th. There slept with his wife (223)	December 1st	Infected after return of wife	St. George's
329	?	f.	17	Sister + 330	Sister had overlooked attack, beginning October 4th. Paper of 329 missing	At work till December 1st	......	St. George's
318	+	f.	10	Brother + (341) incomplete	Brother (case 341) began to be ill November 6th	November 14th	......	Newton
319	+	m.	4	"	Case 341 was only $2\frac{1}{2}$ years old, and having much Diarrhœa, dirtied the carpet	November 16th	......	Newton
332	+	m.	33	Son + (341)	......	November 28th	......	Newton
317	+	f.	7	Brother	......	December 3rd	......	Newton
331	+ inc.	f.	32	Son + (341)	The mother also had a slight attack. These people are very poor	December 3rd ?	......	Newton
320	—	m.	8	Sister + (286)	Sister was removed to hospital on November 7th. They slept in the same bedroom	November 30th	No intermediate case found	Bradford
324	None taken Died	m.	53	Son, æt. 6, taken ill November 20th, and ill for some time. No test	......	December 10th	......	Hulme

No. of Case	Re-action	Sex	Age	Relation of Infector	Degree of intimacy and duration	Date of attack of case	Remarks	District
309	+	m.	4	......	This was followed by three other cases. Father took ill December 18th Mother took ill December 11th Willie æt. $2\frac{1}{2}$ + December 23rd	November 20th	Two applications were made to the Medical Attendant for tests in the case of the father and mother, but they were not taken	Hulme
328	+	f.	6	Brother. No test	Brother began to be ill November 7th. Died December 12th. Clearly Enteric. Not notified	December 10th	......	Hulme
338	+	f.	13	Mother +	Mother nursed at home; only just recovered This girl is said not to have been in contact with her. Case 282	December 20th	......	Hulme
342	+	m.	14	Sister + (286)	See cases 286 and 320. Sister (286) removed to hospital on November 7th. 342 was often by her bedside, and read to her while ill	November 17th	......	Bradford
343	+	f.	7	Sister + 286	......	?	......	Bradford
344	+	f.	13	Sister + 342	Mother reticent. Very unwilling to give information. There may have been other cases at this house.	December 14th	......	Bradford
155	+	f.	16	Brother ? +	Brother taken ill May 1st. Nursed at home. Died May 25th. Case 155 nursed her brother up to his death, and has not been well since	June 21st ?	No intermediate case found	Chorlton-upon-Medlock

There are in addition several other cases which are notified in 1905, and are connected with cases notified in 1904.

One of these occurring at another house (date of onset December 21st) appears to be due to cases 341, and to the series 317, 318, 319, 331, and 332. The supposed manner of conveyance is interesting. A jug was lent by the wife of the new case to the family first attacked, and was used to carry milk for both. It often stood in the sick room, and when taken to the milk dealers was not always clean. But the patient had also visited at the invaded house, though he had not been in the sick room.

The following history, taken by Mr. Hewitt, is given more fully, as it serves to illustrate several points :—

> A.B. (f æt. 3) began to be ill about December 20th, 1904, but was not put to bed till January 9th, 1905. Sanitary district, St. George's. Informant, grandmother, who first saw her on January 9th. Medical attendant called in on January 9th. She was then delirious, had Diarrhœa, and apparently also had Bronchitis. She was nursed by her mother. Notification was received on January 17th, 1905.
>
> Her mother (S.A.B. æt. 27) began to be ill January 4th, also had Bronchitis, was delirious on January 9th, had Diarrhœa, lost her voice, and was deaf. January 17th, desquamation of the skin in large flakes occurred.
>
> This family has been short of food, the father being out of work.
>
> Her father F.B. (æt. 29) began to be ill January 5th. He had severe Diarrhœa only for one day, but his illness was well marked. He had assisted in nursing A.B.
>
> F.B. æt. 7, January 25th. Lived at another house since January 19th Report made on January 13th. Had a severe influenza cold, sore throat on January 19th, lips dry, felt thirsty, felt sick, but did not vomit. January 21st, very languid and feverish.
>
> J.W.B. (æt. 1¼ years) began to be ill January 17th. He had a cough, running at the nose, and fell off his food. January 19th, thirsty, heaved but did not vomit.
>
> C.T. (æt. 2), from next door, followed her mother into the house where the family B. lived, and where she helped to nurse Mrs. B. This child began to be ill of Enteric on January 15th.
>
> On enquiry into the first case (A.B.) Mr. H. found that in a house on the opposite side, A.M., f. æt. 5, a playmate of A-B., had an Influenza cold on December 11th, and that she had been away from school for a week. Doctor (called in on December 12th) is reported to have said that the child was overheated.

In another house on the same side as the family B., three doors away, a little girl (æt. 3), is suffering from a cold. She also is a playmate of A.B.

A request was made for specimens from F.B. and J.W.B. on account of their intense exposure, no history of illness having been given. Mr. Hewitt made out the histories of illness at a subsequent visit.

All the cases "B." gave a $+^{ve}$ Widal reaction.

This family illustrates the striking effect of malnutrition in causing the spread of Enteric. Every family in which a number of cases occurred in 1904 was in very poor circumstances, with the possible exception of the Cheetham family where there was gross overcrowding, and where the disease was ignored. It is not true that Enteric Fever is not favoured by poverty and malnutrition.

It will be noted that extensive desquamation took place in the case S.A.B. This is not a very infrequent occurrence in regard to Enteric Fever, and it would sometimes be easy to mistake a convalescent from Enteric for a case of Scarlet Fever.

But the most striking feature of this history is the extremely slight nature of the illnesses by which the disease may be handed on, and doubtless is so, of which, also, it cannot be doubted that we usually hear nothing.

Had it not been for Mr. Hewitt's visit, one would have known nothing about the last four cases.

These cases often occur in young children, who are most dangerous as regards the spread of the disease.

In continuation of cases 223 and 311, it may be remembered that 223, on her return from hospital, went to the house of her parents, and that her husband (311) contracted the disease there.

The following further cases occurred at this house :—

1.—f. æt 17, sister to 223, took ill December 20.

2.—m. æt 14, brother to 223, took ill about December 18.

3.—f. æt $\frac{8}{12}$, daughter of 223, date of illness not known. All three gave $+^{ve}$ Widal reactions.

2 was a slight and quite overlooked illness.

In 3 there was no history of illness. These cases were tested on account of their exposure to infection.

It is, I think, a question whether cases of Enteric do not occur without any illness, or, at all events, without noticeable illness, in which the reactive processes are very acute, and in which there is generated a sufficiency of anti-bodies to confer temporary immunity. If so, the difficulties of prevention are still further increased.

But such cases as those just mentioned, in which well-marked reactions are present, seem to raise this question.

Some years ago, the only clue ascertained to the occurrence of Enteric Fever in the staff of a hospital appeared to be that one of the patients in a ward indicated by the cases gave a $+^{ve}$ Widal reaction. Yet no clear history of illness could be established in that case.

Cases like the above, however, render the possibility of such sources of infection much more probable, and their number can be easily added to.

The Public Water Supply.

We may now consider the possible influence of the water supply. This divides itself into two parts: the influence of the water as it leaves the supply reservoirs to enter the main conduits, and the influence of the water as affected by local faults in pipes.

In considering the general influence of the water supply as delivered in the City, one may first mention that from Professor Delépine's examinations it is found to be of high bacteriological purity, higher than before it enters the pipes.

It is probable that this is due to the slime which forms a coating on the pipes. As the water rolls over this slime on its way to the City, it parts with such bacteria as it possesses, and, in default of local detachments, or partial bursts, the slimy coat will hold on to the bacteria. Supposing the water contaminated at its source, there seems to be no doubt that a considerable measure of protection would thus be afforded, but experience shows that spread of Enteric would all the same occur by the water.

It is probable that the rapid reduction in the number of bacteria which occurs in a river, after the introduction of contamination, when the water has passed onwards for a mile or two, is brought about in the manner suggested.

The question, however, which we have to consider is:

Does the water supply, as a matter of fact, spread Enteric Fever?

In answering this question, one first refers to a map showing the distribution of the mains from the different supply reservoirs. From these, one sees the outlying districts supplied from the different reservoirs. If, then, we have the populations of these districts, and their Enteric Fever facts for a number of years, it will be easy to see whether such incidence of Enteric Fever as occurs can be ascribed to the water supplies. I have, therefore, communicated with the Medical Officers of Health of a number of districts, who have kindly supplied the facts tabulated (pages 117 and 118).

Table showing for the years 1900-1904 the incidence and Death-rate from Enteric Fever in each of a number of Outlying Districts supplied with Thirlmere and Longdendale Water.

Districts using water from Prestwich Reservoir (Thirlmere)	Population 1901	1900				1901				1902				1903				1904			
		Cases of Enteric Fever	Deaths from Enteric Fever	Case Mortality	Death-rate per 1000	Cases of Enteric Fever	Deaths from Enteric Fever	Case Mortality	Death-rate per 1000	Cases of Enteric Fever	Deaths from Enteric Fever	Case Mortality	Death-rate per 1000	Cases of Enteric Fever	Deaths from Enteric Fever	Case Mortality	Death-rate per 1000	Cases of Enteric Fever	Deaths from Enteric Fever	Case Mortality	Death-rate per 1000
				per c't				per c't				per c't				per c't				per c't	
Eccles	34500	29	6	20·7	0·18	54	9	16·6	0·26	33	4	12·1	0·11	16	3	18·7	0·08	36	7	19·4	0·19
Partington	552	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—
Pendlebury	11800	23	5	21·7	0·42	46	9	19·6	0·76	23	8	34·8	0·67	17	1	5·9	0·08	33	11	33·3	0·86
Swinton	15100	23	2	8·7	0·13	32	7	21·9	0·46	14	4	28·6	0·26	16	5	31·3	0·33	8	—	—	—
Worsley	12462	12	2	16·7	0·16	13	3	23·1	0·24	17	3	17·6	0·24	12	2	16·7	0·16	11	5	45·4	0·39
Pendleton	67023	71	7	9·9	0·11	79	21	26·6	0·31	82	18	21·9	0·26	62	14	22·6	0·20	42	12	28·6	0·17
Broughton	49386	46	13	28·2	0·27	38	9	23·7	0·18	22	7	31·8	0·14	19	7	36·9	0·14	10	2	20·0	0·04
Using Godley Water (Longdendale)																					
Denton	14962	10	2	20·0	0·13	7	2	28·6	0·13	20	6	30·0	0·39	19	2	10·5	0·13	16	3	18·8	0·19
Prestwich	9842	1	—	—	—	4	1	25·0	0·10	1	—	—	—	8	3	37·5	0·29	4	1	25·0	0·10

Table—*continued.*

Districts using water from Audenshaw and Denton Reservoirs (Longdendale	Population 1901	1900 Cases of Enteric Fever notified	1900 Deaths from Enteric Fever	1900 Case Mortality per c't	1900 Death-rate per 1000	1901 Cases of Enteric Fever notified	1901 Deaths from Enteric Fever	1901 Case Mortality per c't	1901 Death-rate per 1000	1902 Cases of Enteric Fever notified	1902 Deaths from Enteric Fever	1902 Case Mortality per c't	1902 Death-rate per 1000	1903 Cases of Enteric Fever notified	1903 Deaths from Enteric Fever	1903 Case Mortality per c't	1903 Death-rate per 1000	1904 Cases of Enteric Fever notified	1904 Deaths from Enteric Fever	1904 Case Mortality per c't	1904 Death-rate per 1000
Barton Moss	234	—	—	—	—	1	1	100·0	4·3	—	—	—	—	—	—	—	—	—	—	—	—
Burnage	1890	1	—	—	—	—	—	—	—	—	—	—	—	1	1	100·0	0·51	—	—	—	—
Chorlton-cum-Hardy	9133	3	—	—	—	2	1	50·0	0·11	1	—	—	—	3	—	—	—	—	—	—	—
Davyhulme	1231	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
Didsbury	9291	2	—	—	—	6	—	—	—	3	1	33·3	0·11	5	—	—	—	2	1	50·0	0·10
Flixton	3656	2	2	100·0	0·55	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—
Gorton	27000	61	10	16·4	0·38	84	8	9·5	0·33	33	6	18·2	0·22	43	8	18·6	0·28	35	5	14·3	0·17
Levenshulme	11700	1	1	100·0	0·09	5	2	40·0	0·17	1	—	—	—	8	1	12·5	0·07	3	—	—	—
Stretford	30436	20	5	25·0	0·17	17	2	11·8	0·07	21	3	14·3	0·10	14	5	35·7	0·15	17	2	11·8	0·06
Withington (Township)	13702	2	—	—	—	3	—	—	—	2	—	—	—	5	—	—	—	3	1	33·3	0·07

It is quite evident from these facts that local influences have far more to do with the incidence and death-rate from Enteric Fever than the water supply, and the cases of Withington, Chorlton-cum-Hardy, and Didsbury show that, so far as Audenshaw water is concerned, this influence is nil. The same is also true probably of Thirlmere water, though the figures do not offer positive proof of that.

We may, however, pursue the question further.

It would appear from the map of the Waterworks Department that the central part of Manchester is supplied from the Audenshaw and Gorton reservoirs; Hulme, Rusholme, Withington, Gorton, etc., from the Audenshaw reservoir; Newton from the Godley reservoir; St. George's from the Godley and also from the Prestwich reservoirs (Longdendale and Thirlmere); Ancoats from the Audenshaw reservoir; Cheetham and Harpurhey from Prestwich and Godley. Further, there is no absolute separation, as the mains are connected so that they can be filled from any of these sources.

Now, with a view to learn what may be discovered from the distribution of Enteric Fever in Manchester, I have arranged the cases, distinguishing those giving from those not giving a $+^{ve}$ Widal reaction, in months, for each sanitary district of the City, and for each of five years.

These table-pictures will be considered afterwards, but they may be here introduced with reference to the water supply. (See pp. 151, 152, and table.)

They show, except for one year, a singular variability in the times of the year at which different districts supplied from the same reservoirs are affected by Enteric, a fact which is quite incompatible with the ascription to the water supply of any contamination at the source. Some difficulty in reasoning arises where districts are supplied from two sources. Take, for instance, St. George's in 1904. There is a very heavy incidence on this district throughout the year. This cannot be due to Thirlmere water, since, if we refer to Cheetham, we see that there are almost no cases in that district till October, and the increase then was due to infection in one family.

For the same reason the increase in Harpurhey from August to October cannot be due to Longdendale water. In like manner the increase in St. George's cannot be due to Godley water, since there is no increase in Newton in August or September. In fact, the incidences on the districts throughout are not in correspondence, a circumstance which precludes the public water supply as their cause.

This reasoning does not affect the possibility that contamination may be introduced at local faults in pipes, or may otherwise be conveyed by water, as by the contamination of stand pipes.

Nevertheless, there is very little pointing in this direction. There are some half dozen cases in which a water pipe had burst. But there is nothing to indicate that these occurrences had anything to do with the attacks, or that they caused other attacks.

The Milk Supply.

In like manner we may dismiss the milk supply as having exercised any serious effect in the production of Enteric Fever in 1904. We have now, for some years, had the retail and also the wholesale vendors ascertained in each case. On referring to the particulars, we find that the vendors are almost as various as the cases. There are, however, a few wholesale companies which yield a number of cases. Thus we have :—

A	8
B	2
C	7
D	3
E	3
F	7

In order that suspicion may legitimately rest on a company the cases must occur within a reasonable period, say six weeks, and must bear some proportion to the size of the supply.

Only three of the above fulfil this condition, and the numbers of cases thus brought under suspicion are 3, 3, and 4. No source of infection was, however, discovered.

Shellfish.

The relation of Enteric Fever to shellfish in a city like Manchester is difficult to determine. It is not sufficient to establish that a person attacked with Enteric Fever consumed shellfish before developing the disease. The frequency of such consumption without ill-effects has to be borne in mind. It is necessary also that the date of consumption should be such that infection is possible. Often, also, other persons have partaken of the shellfish at the same time without ill-effects, and it is certain that many will have partaken of the same consignment who are not reported as suffering from fever.

It is often impossible to discover the retail dealer, still more difficult to ascertain the wholesale dealer, and almost impossible definitely to ascertain the origin of the shellfish.

The enquiries are not rarely imperfect.

It is probable, however, that shellfish help to swell the aggregate of diarrhœal affections, and to reinforce them, when otherwise they tend to fail.

The facts ascertained as to the relations between the consumption of shellfish and the occurrence of Enteric Fever during 1904 are as follows :—

SHELLFISH PARTICULARS.

No. of case	District	Sex	Age	Class of Shellfish	Date of Illness	Interval between consumption of Shellfish and Illness	Raw	Cooked	Others consuming	Other source	Retailer	Wholesale Vendor	Re-action
8	Openshaw	m.	24	Mussels	? About Jan. 1	About 11 days	Yes	...	?	...	Shops in Deansgate ?	......	+
10	Openshaw	m.	42	Mussels	Jan. 11	10 days	Raw	...	None	...	181 AOR Openshaw	Market (A)	+
18	Moston	m.	25	Mussels	Jan. 28	About 15 days	...	Yes	None	...	Hawker	......	+
25	St. George's doubtful case	f.	17	Oysters	About Jan. 24	About 14 days	Yes	...	None	...	......	Market	...
31	Ancoats probably not E	m.	28	?	Jan. 30	Within 3 weeks before	Yes	...	None	...	......	......	...
33	Hulme	m.	29	Mussels also Oysters	Jan. 14	About 19 days	Raw	Yes	...	...	......	(A)	+
35	Hulme	m.	31	Mussels	Jan. 19	A week	...	Yes	None	...	Hawker	......	+
47	Beswick	f.	21	Mussels	Feb. 16	11 days	Yes	...	Mother also	...	263 ANR Beswick	(Conway) (B)	+
50	Hulme	m.	32	Mussels	Feb. 6	7 days	Yes	...	None	...	......	(A)	+
56	Central	m.	18	Kind ?	March 2	8 days	?	?	None	...	......	......	+
59	......	m.	19	Mussels	Feb. 29	1 and 8 days	Yes	Yes	One other free from illness	...	263 ANR	(Conway) (B)	+

SHELLFISH PARTICULARS—*continued.*

No. of case	District	Sex	Age	Class of Shellfish	Date of Illness	Interval between consumption of Shellfish and Illness	Raw	Cooked	Others consuming	Other sources	Retailer	Wholesale Vendor	Re-action
64	Hulme	m.	23	?	March 9	12 days	...	Yes	?	...	......	......	+
69	Hulme	f.	42	Oysters	January 14	A week	Yes	...	Others also	...	......	......	+ inc.
73	St. George's	m.	37	Mussels and Oysters regularly	March 20	......	Yes	Yes	Yes	...	......	......	+
77	Newton	m.	31	Mussels almost daily	March 16	......	Yes	...	No	...	Shops and Hawkers	......	+ ?
81	St. George's	m.	14	Mussels occasionally	April 5	......	...	Yes	Family	...	(C)	Various	+
100	St. George's	f.	45	Oysters, Blue Points	April 2	3 weeks	Yes	...	Friend and her husband quite well	...	......	Smithfield Market	+
105	Openshaw	m.	26	Periwinkles	April 30	1 week	...	Yes	Others in the family	..	......	......	+
110	Openshaw	m.	31	?	April 23	?	...	Yes	No	...	......	......	+
133	Hulme	m.	20	?	May 30	?	?	?	No	...	......	.....	+
135	Openshaw	m.	33	Mussels	April 1	None	...	Yes	Wife also	...	......	......	+
149	Openshaw	m.	26	Mussels	June 11	About 3 weeks	Yes	.	?	...	(C)	......	+

SHELLFISH PARTICULARS—*continued.*

No. of case	District	Sex	Age	Class of Shellfish	Date of Illness	Interval between consumption of Shellfish and Illness	Raw	Cooked	Others consuming	Other source	Retailer	Wholesale Vendor	Reaction
196	Hulme	f.	51	Oysters	Aug. 16	8 days	Yes	...	No	...	...	...	— ? Post-mortem Ulcers Pyers Patches
232	Central	m.	35	Mussels	Sept. 17	??	Yes	...	...	...	...	...	+
240	West Gorton	f.	36	Mussels	Sept. 18	11 days	Yes	...	...	...	Stall, Gorton Wakes	...	+
244	Ancoats	m.	25	Mussels and Oysters raw	Sept. 25	14 days and 22 days	Yes	...	No	...	Shop in Harpurhey ?	...	+
255	Hulme	m.	23	Mussels	Sept. 29	21 days	...	Yes	Family (3)	...	Hawker	...	o
256	Ancoats	m.	21	Mussels Oysters	Sept. 25	8 days 15 days	Yes Yes	...	No	...	...	(D) (H)	+
262	Openshaw	f.	10	Mussels	Sept. 30	Mussels every week	Yes	Yes	All the children. All were ill with Sickness and Diarrhœa Sept. 4	...	386 AZOR and Hawkers	...	+
264	Hulme	m.	36	Mussels	Oct. 4	Mussels once a week, 10 days	Yes	...	No	...	Chester Road	(D)	+

Shellfish Particulars—*continued.*

No. of case	District	Sex	Age	Class of Shellfish	Date of Illness	Interval between consumption of Shellfish and Illness	Raw	Cooked	Others consuming	Other source	Retailer	Wholesale Vendor	Re-action
266	Chorlton-upon-Medlock	f.	27	Mussels	October 3rd	4 days?	Yes	...	No	...	...	...	+
271	Hulme	m.	25	Oysters	September 26th	6 days	Yes	...	No	...	Various places	...	— Enteric
289	West Gorton	m.	25	Mussels	October 24th	18 days	...	Yes	No	...	Wellesley Street	Various	+
290	Ardwick	m.	40	Mussels, 4 quarts	October 29th	10 days	...	Yes	No	...	...	Retail Fish Market	+
295	Hulme	f.	22	Mussels	October 1st	2 weeks	Yes	...	No	...	Chester Road	see 264 (D)	+ inc.
297	Harpurhey	m.	35	Mussels	October 31st	11 days	Yes	...	No	...	Rochdale Road	Keyworth	+
302	Bradford	m.	14	Mussels once a week	November 17th	?	Yes	...	Others in family	...	...	...	+
303	Ancoats	m.	12	Mussels	November 25th	10 days	Yes	...	Rest of family	...	...	...	+
304	Central	f.	45	2 Oysters	November 4th	3 days	Yes	...	No	...	Hawker	...	+
306	Bradford	m.	27	Mussels	Nov. 5th and afterwards	21 days or less	...	Yes	None cooked, others had them raw	...	Hawker	...	+

Shellfish Particulars—*continued.*

No. of case	District	Sex	Age	Class of Shellfish	Date of Illness	Interval between consumption of Shellfish and Illness	Raw	Cooked	Others consuming	Other source	Retailer	Wholesale Vendor	Reaction
309	Hulme	m.	4	Mussels	November 20th	14 days	...	Steamed	?	...	...	(D)	+
321	West Gorton	f.	18	? Mussels	November 23rd	14 days	Yes	...	All the family	...	...	...	+
322	Chorlton-upon-Medlock	f.	29	Oysters	December 3rd	11 days	Yes	...	No	...	...	...	+
323	Crumpsall H.	m.	28	Mussels in Blackpool	November 23rd	21 days	Yes	...	No	...	...	...	+
325	Hulme	f.	35	Mussels	December 5th	17 days ?	Yes	...	Several others	...	...	...	+
333	Hulme	m.	29	Mussels	December 17th	12 days	...	Yes	Another child had raw whelks	...	...	...	o
				Whelks	...	5 days	Yes	...					
339	St. George's Father is a dealer, and stores shell-fish in his house. Drogheda ? or Conway ? Mussels	m.	17	Mussels often	December 15th	?	Probably	Yes	Other members of the family	...	...	Fish Market	+

There can be little doubt, from some supplementary enquiries which have been made, that the facts might be fuller, but the enquiries needful are troublesome and time consuming, and the sanitary inspectors have other work to do.

It is much to be regretted that the particulars ascertained in regard to the consumption of shellfish are often so deficient and indefinite. Partly this is owing to the fact that the patient has been removed to hospital when the enquiry is made; partly to the mental confusion in which the patient and his friends are at the time; partly to the fact that the particulars are not available. But there is also, sometimes, an absence of effort to get as precise information as possible.

Using, however, such materials as we have, we see that there are 46 cases in which mussels or other shellfish were consumed prior to the attack.

In assessing the value of these particulars, it is necessary to remember that enormous quantities of mussels are consumed in Manchester, especially in the earlier part of the season, commencing on September 1st.

Accordingly, we find that mussels are mentioned alone in connection with cases no fewer than 30 times, while oysters come into question by themselves only 6 times. Both were consumed 4 times.

Arranged in quarters, mussels and oysters were consumed as follows :—

	First	Second	Third	Fourth	Total
Mussels	8	3	4	15	30
Oysters	2	1	1	2	6
Mussels and Oysters..........	2	...	2	...	4
Other Shellfish	...	1	...	...	1
Kind unstated	3	2	...	...	5
Total	15	7	7	17	46

It will be noted that the facts are ascertained with more precision during the last quarter.

It is a question of some importance whether the shellfish were eaten raw or cooked. The facts for mussels are as follows, arranged in quarters. Oysters are always recorded as having been consumed raw. Where the kind of

shellfish is not stated, the Inspector has once omitted to state whether they were cooked in the first quarter, and once again in the second :—

	MUSSELS				
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Raw	5	2	5	10	22
Cooked	3	1	1	4	9
Both raw and cooked	2	—	—	1	3
Total	10	3	6	15	34

As regards the effect of cooking, it cannot be doubted that it must exert a very destructive effect on contained bacilli, even in its slighter degrees. It varies from boiling for 10 minutes to slight steaming, or placing the mussels on the fire-bar till they open.

In considering whether the facts prove anything in regard to infection, we have first to enquire whether the cases found to be associated with the consumption of shellfish are susceptible of other explanation.

It is a remarkable fact, considering how numerous are the histories of infection, that not one of these cases is connected positively with another case. The only one in which a suggestion is made of direct infection is 303, taken ill November 23rd, and here the only history is that a baby was ill of Diarrhœa in October. The absence in these cases of exposure to infection from a known previous case certainly does convey some suggestion that these cases were in part due to the shellfish consumed.

We have seen that 22 persons consumed mussels raw for every 9 who had them cooked. Does this throw any light on the facts. It was given in evidence before the Royal Commission on Sewage Treatment that enquiry had been made in Manchester at 1354 houses, mostly of the artisan class, and that information had thus been obtained to the effect that in 1902 shellfish had been used at one or other time during the year in 384 of these houses. At 90 houses they had been consumed raw, and at 360 cooked. At 45 houses shellfish were habitually consumed.

If, then, it were a matter of indifference as regards the cases of Enteric Fever investigated whether they had or had not consumed shellfish, it would equally be a matter of indifference whether such shellfish were cooked or raw; and if we could apply generally the results of the above enquiry to mussels,

we should expect that there would be *not* 22 cases who had used raw mussels, and 9 who had used cooked mussels, but 9 cases who had used raw mussels and 36 who had used cooked mussels.

It does, therefore, appear that the figures relating to the condition of mussels as regards cooking indicate a certain degree of infection by mussels.

Do the above figures give any indication of the frequency with which one might expect to find the consumption of shellfish connected with Enteric Fever? If we assume that such an enquiry as the above was applicable to 60,000 houses, we might assume also that the families in which shellfish are habitually consumed run a decided risk. The number of such houses would be $60{,}000 \times 45/1354$, or some 2,000. Taking the proportion in which shellfish would be consumed raw at one-fifth, we should thus have 400 exposed to risk.

Is not the actual number unduly small?

Such a mode of reasoning would, however, overlook the fact that the great bulk of the shellfish is quite free from danger, and that it is only those shellfish which come from places specially exposed to pollution which are dangerous.

Again, it is not even a mere question of the relative amount of infection reaching particular layings. Dr. Klein, in a recent investigation, has shown that where there is contamination by sewage the vital processes of the shellfish are impeded, and the infection is got rid of more slowly. Probably, also, the shellfish die more readily, and thus serve in greater abundance to keep a store of infectious germs in the laying.

The amount of danger arising from particular layings will thus depend partly on the amount of Enteric Fever occurring amongst the shore population, partly on the size of the population, and partly on the amount of filth which reaches the layings. The condition of the shellfish will give valuable indications of danger to the market expert, and in fact certain layings are regarded on such evidence with suspicion.

We cannot, therefore, draw any conclusion from the comparative smallness of the number of cases which we are able to connect with shellfish, which is yet too large, if half of them could be assigned with certainty to this cause.

In a limited number of cases, it has been possible to trace the actual dealer in Shudehill Market from whom the mussels (or oysters) were procured. It is not much use, generally, to attempt to ascertain where a particular batch of mussels has come from. But I have obtained from Mr. Holburn a list of the large vendors of shellfish both in the wholesale and retail market, and in the case of certain of them the places from which they have obtained their supplies. He informs me also that certain places may be viewed with suspicion. For example, Conway mussels have come under my suspicion in

previous years, but Neston and Parkgate are not above suspicion. Drogheda requires investigation. Belfast mussels may be regarded as doubtful. Dutch mussels have a doubtful reputation.

I have also obtained, in two or three cases, through the Inspectors, information as to where mussels came from.

The materials collected may thus be set forth.

The total number of cases in which it has been possible to trace the wholesale dealer (whether in the wholesale or retail fish market) is 14.

Of these, three occurring in January and February belong to a dealer whom we shall call A (Shudehill).

To another whom we shall call B (Shudehill) belong two cases in the latter half of February.

To another whom we shall call C (Shudehill) belong three cases, one in April, one in June, and one in October.

To another, D (Shudehill), belong four cases, three of whom begin within a week of each other, all of which are in September, October, and November.

Two other dealers have one case each.

Thus, out of 14 cases in which the wholesale dealer was traced, 12 belong to four dealers. One of these supplies, we know, came from Conway, viz.: B.

Dealer A obtained his supplies early in January from Drogheda and Parkgate, early in February from Drogheda.

It is doubtful whether the cases C can be said to indicate any particular place. If they do, they point to Creetown.

The cases D however, strongly suggest infection.

We find that at the time the four cases were infected, supplies were coming from Parkgate and Conway amongst other places.

It will thus be necessary that special attention be again directed to these sources of supply.

It should be added that the number of large dealers is 12, so that the facts do strongly indicate infection. This becomes more striking when it is mentioned that the four firms indicated are all in the retail fish market, while the wholesale men are not indicated at all. If this is so, then the hawkers who get their mussels chiefly from the retail market, and who are often mentioned in connection with cases, will be very likely to vend infected mussels.

If, now, we combine the trains of enquiry, and remember how completely the cases connected with shellfish are dissociated from the ordinary mode of infection; when we recall that the numbers connected with raw and cooked mussels quite reverse the relative numbers who use mussels, raw or cooked respectively; when we find that those instances which we can carry back to the wholesale dealer point strongly to particular dealers; and when we find, further, that these dealers draw their supplies or portions of them from places which have come under suspicion—a strong case is made out for believing that mussels are in some instances responsible for the spread of the disease. This belief becomes stronger when we find that the mussels are coming from the suspected places at the periods when the mussels suspected have been connected with cases, and when we see that these cases tend to come in groups.

These facts strongly suggest that in a large portion of the 46 cases, the connection between the consumption of shellfish and the occurrence of Enteric Fever is one of cause and effect.

We may consider, therefore, who are the infected persons who have consumed the shellfish. The facts are these:—

SEX AND AGES OF PERSONS WHO HAVE CONTRACTED ENTERIC FEVER AFTER CONSUMING MUSSELS AND OYSTERS.

	Ages					
	0-14	15-24	25-34	35-44	45 and upwards	Total
Mussels alone.						
Males	4	4	10	5	—	23
Females	1	3	1	2	—	7
Mussels and Oysters.						
Males	—	1	2	1	—	4
Females	—	—	—	—	—	—
Oysters alone.						
Males	—	—	—	1	—	1
Females	—	1	1	1	3	6
Total	5	9	14	10	3	41

We thus see that men consume mussels to a very much larger extent than women, so far as can be judged from the greater incidence on them of Enteric Fever. On reference to the Inspector's papers, we find that they also consume them apart from other members of the family to a greater extent than women do. We may take it that men are exposed to considerably more risk from this source than women. It is also possible that infection by mussels plays a much larger part in the propagation of Enteric than appears on the surface. We see that it is precisely those persons who would refuse to recognise that they were suffering from illness who consume mussels. It is possible that a considerable number of unrecognised attacks are thus produced. This is the more likely, as it is not very unusual for mussels to produce Diarrhœa forthwith, Enteric Fever establishing itself later on, so that an attack of Enteric Fever due to this cause may easily be regarded as only one of Diarrhœa.

It is to be hoped that attention to shellfish as a source of danger will not be relaxed.

Other Foods.

Amongst other foods which have been believed to contribute to the propagation of Enteric Fever are ice creams, salads, fruit, fried fish, and others, and in many cases enquiry has been made into the possibility of infection from these sources.

Ice creams, in so far as they are contaminated, do not owe their contamination to the milk used in producing them. Danger may be supposed to arise at two points :—First, at the places where they are made, when persons living there have been attacked. This risk they share with all milk supplies, only in a less degree. A second possible source of danger arises from the repeated washing of the vessels in which the ice creams are served, and of the spoon, in the same water, which gets very foul.

This is done away with by serving the ice cream in paste cups, and it should not be permissible to serve ice creams in the streets in any other manner.

Enteric Fever is not likely to be frequently communicated by this means. Yet there is, no doubt, some risk from this source, which may be guarded against only by a vigilant inspection of ice-cream makers and vendors.

Salads—Watercress, Lettuce, Celery.

It is probable that salads are responsible for a certain proportion of the cases. I requested Mr. Hewitt, therefore, to collect information at the market on these points. What are the seasons, and the facts as regards cleansing, of the above salad stuffs?

If salads are carefully gathered, and are not washed with contaminated water, the effect of contamination in the water in which they may be grown will be diminished.

Watercress, it appears, is in season from November to May. It is out of season in June, July, and August. It is never washed before sale, though cold water may be sprinkled on it to keep it fresh, and make it weigh heavier. It is cut by hand, packed in baskets, and sent to Manchester from all parts of England, especially from the South.

The "Fruit Grower" of October 2nd, 1904, contains an article on the culture of watercress, calling attention to the excellent methods of Mr. Bedford at Bere Regis, and it seems evident that if watercress is still grown under insanitary conditions an effort is being made to do away with such supplies or to purify the water in which the cress is grown.

Celery is in season from October to the end of February. It comes from Cheshire, Lincolnshire, and Yorkshire. That from Cheshire is washed, not so the celery from Lincolnshire and Yorkshire. It is undoubtedly safer not to wash celery before it reaches the house, though it should then be very carefully washed in clean water.

Lettuce is in season from May to August, though a quantity comes from France in March. It is pulled up by the roots, which are sometimes cut off. The pieces are then tied up into bundles and taken to the market. It is said never to be washed. This I believe not to be the fact, though it is better that it should not be washed till it reaches the house. The chief dangers, then, to which salads are exposed before arrival are contamination of the stalks and leaves of watercress which has grown in dirty water, contamination of lettuce and celery from washing them in impure water before sending them to market, or in the market.

Another and greater danger attaching to the use of salads, however, is in their being handled in the market, or in greengrocers' shops, by persons suffering from Enteric Fever, or who have been in contact with cases of that disease, and it is very necessary that salads should be carefully washed at home before use.

Fruit.

The danger is still greater in the case of fruit, which is liable to be infected by the hands of persons suffering from Enteric Fever, or who have been in contact with a case, during the picking of the fruit, in the market, and in the retail shop, while, in addition, over-ripe fruit is liable to be specifically infected by flies.

There is, I am informed, ground for believing that the juices of over-ripe fruit form a favourable soil for bacilli of the coli group, and it may be owing to transmission of infection by flies that over-ripe fruit owes its power to cause Diarrhœa.

It will be seen, therefore, that a case of Enteric Fever occurring in persons handling salads and fruit is especially dangerous, and should be very promptly diagnosed and isolated.

Other Foods.

Many other foods may, however, become contaminated. The cold potted meats, slices of ham, etc., exposed in shops visited by crowds of flies may serve in an infected neighbourhood to carry the disease. It is no uncommon thing to keep cooked food at home for a day or two at the end of the week, and in the many houses in which flies swarm, they must contaminate such food, as well as jams, syrups, sugar, condensed milk, soups, etc. There should, I think, be a general effort made to secure foods from the access of flies during the warm season.

Fried Fish Shops.

No specific evidence is forthcoming of the spread of Enteric Fever in these shops during 1904.

Influence of Circumstances and Occupation.

We may now consider the incidence of Enteric Fever relative to the circumstances of the persons attacked. During 1904 the disease was practically confined to the families of artisans and to the poorer classes. The influence of poverty and malnutrition in causing the spread of Enteric was most obvious and marked. There can, I think, be no doubt whatever that when the mode of infection is chiefly by the common channels of intercourse, as in Manchester, the effects of poverty, distress, and ignorance in spreading Enteric Fever are quite as conspicuous as in the case of any other disease. No doubt, if large quantities of infection are imported in water or milk, this relation will be obscured, and it will then appear that good health and better surroundings are no protection. That is due, however, to quite special circumstances. In fact, it would seem from a study of all the cases as if a considerable intensity of infection and intimacy of exposure, combined with some degree of malnutrition, were necessary for Enteric Fever to spread in a household; and as if, like Tuberculosis, this disease was not communicated except on the ingestion (or inhalation) of a decided quantity of infection.

Influence of Sex.

It is a well-known observation that males suffer more heavily than do females. Curschmann, while mentioning this, considers that the difference is explicable by the greater extent to which men move about, and their corresponding increase of exposure to infection.

From the Census returns we get the following numbers of persons living in Manchester at the Census taking :—

Males age 14 and upwards	Occupied females 14 and upwards	Unoccupied females 14 and upwards	Children under 14 years of age.
* 181,172	86,978	110,878	164,844

Occupied persons, 268,150 ; unoccupied females and children, 275,722.

The following figures show the relative numbers of Enteric cases ascertained during each of five years among workers, women unoccupied, and children under 14 respectively quarter by quarter. These cases, it will be remembered, are reliable, having most of them been submitted to the Widal test, and been, in addition, carefully scrutinised.

Only for 1904 have occupied males been separately given. For the other years, occupied females have been added to occupied males.

For 1904 the total number of cases accepted for classification is 119. Of these, five persons at working ages were out of occupation at the time. One contracted the disease in the Chorlton Union Hospital, and one in H.M. Prison, Strangeways. To this last occurrence no clue could be found.

These five persons, four men and one woman, have been included amongst the workers.

The table for 1904 is therefore :—

	Workers, Male, over 14			Workers, Female, over 14			Women employed in housework			Children up to 14			Total
†	+	—	o	+	—	o	+	—	o	+	—	o	
	31	4	1	11	1	0	11	1	1	14	0	0	75
	28	5	2	9	0	0	9	0	0	13	3	0	69
	35	4	5	18	0	0	10	0	1	24	4	0	101
	20	2	4	6	2	0	19	1	1	16	2	1	74
Total......	114	15	12	44	3	0	49	2	3	67	9	1	319
	183						128						

* From this number, unoccupied males above the age of 14 have not been subtracted, and, accordingly, cases of Enteric in males at or above the age of 14 have been included amongst those in workers. No material difference is thus produced.

† + Means serum reaction positive. — Reaction negative. o No test made.

On referring to the Census figures of population, it will be seen that occupied persons are about equal in number to unoccupied women and children.

We see that in 1904 the proportion of male persons employed to the number of male workers exceeds the proportion in the case of children, in the case of unoccupied females to a much less extent, and to a still lesser extent, but considerably in the case of occupied females.

This I suspect to be the usual relation.

The total number of employed persons attacked was 183; of women at home and children under 14, 128.

There was, therefore, a decidedly heavier incidence on employed persons.

The tables relating to the years 1900-1904 are as follows. It will be seen that the incidence of Enteric Fever is markedly heavier on occupied persons than on women employed at home and children for every year, and for every quarter of each year.

ENTERIC.

1900.

Workers			Females doing housework			Children under 14		
+	—	o	+	—	o	+	—	o
46	2	1	6	—	2	23	3	—
36	4	9	14	1	1	10	2	—
60	1	5	13	1	—	18	1	2
52	7	7	15	1	1	20	2	2

1901.

Workers			Females doing housework			Children under 14		
+	—	o	+	—	o	+	—	o
21	3	4	7	—	—	6	—	1
1 blood spoiled, undoubted Enteric in first quarter.								
21	—	3	7	1	1	6	—	—
71	5	11	23	—	1	31	—	5
52	5	7	19	2	1	23	—	1

1902.

Workers			Females doing housework			Children under 14		
+	—	0	+	—	0	+	—	0
30	4	3	12	1	...	12	1	1
51	1	2	7	...	...	14	..	1
57	6	5	14	...	2	22	1	...
61	2	2	15	...	1	30	...	...

1903.

Workers			Females doing housework			Children under 14		
+	—	0	+	—	0	+	—	0
48	...	3	5	1	...	23	...	...
50	1	3	11	...	...	12	3	1
40	2	3	15	2	...	15	...	2
62	1	2	17	2	1	34	...	...

Case 396.—In last quarter no particulars given; no specimens taken.

These tables may be put also in the form of percentages for each class of the total number of cases occurring during the quarter under consideration.

Table showing the Percentages in Quarters of the cases of Enteric Fever, Working, Engaged in Housework, or in Children under 14 Years of Age.

1900

Workers	Females doing Housework	Children under 14
(1)—58·3	9·5	32·2
(2)—63·6	20·8	15·6
(3)—65·3	13·9	20·8
(4)—61·7	15·9	22·4

1901		
(1)—66·7	16·7	16·7
(2)—65·1	20·9	14·0
(3)—59·2	16·3	24·5
(4)—58·2	20·0	21·8
1902		
(1)—57·8	20·3	21·9
(2)—70·1	10·4	19·5
(3)—63·5	15·0	21·5
(4)—58·6	14·4	27·0
1903		
(1)—63·8	7·5	28·8
(2)—66·7	13·6	19·7
(3)—57·0	21·5	21·5
(4)—54·6	16·8	28·6
1904		
(1)—65·2	17·4	17·4
(2)—61·3	12·0	26·7
(3)—57·4	14·9	27·7
(4)—51·2	24·4	24·4

If, then, we represent the populations as percentages of the total number under consideration, we are able to make a direct estimate of the relative incidence.

Percentages of :—

Males 14 and upwards	Occupied Females 14 +	Unoccupied Females 14 +	Children under 14
33·31	15·99	20·39	30·31
49·30		50·70	

On comparing these figures with the table of percentage distribution of cases, we see that the incidence of Enteric Fever is heavier on occupied persons in every quarter of every year than it is on women employed at home, except in the fourth quarter of 1904, when the difference is not very great.

It is worth enquiring what this means. We may not be able to ascertain the whole of the causes of these marked differences, but we may partly succeed; and it would probably be worth while to do so.

The first question to be asked, then, is whether these figures represent facts? I do not believe they do. It is probable, I think, that the number of cases of Enteric reported to the Health Office is exceeded by the number of which we hear nothing. We have already seen that, especially in the case of young children, Enteric Fever is not infrequently regarded as Epidemic Diarrhœa. Less frequently the reverse mistake is made.

Many cases of Enteric Fever have been discovered by us on investigation of other cases notified. We have proved the tendency to conceal cases altogether in exceptional instances. In the case of children there is a tendency to treat their attacks as simple Diarrhœa. My impression is that this is a frequent occurrence, and that the illness is often allowed to run its course until some adult is attacked.

Indeed we have seen that in a number of cases this is provably so; but I believe it to be a frequent occurrence.

Then, again, the mother or eldest daughter can often not be easily spared from a house, and there is a tendency to avoid facing the possibility of a serious illness. If the attack is mild, and passes off, so much the better; it was nothing.

In the case of workers there is also a decided reluctance to be thrown out of work. A week or a fortnight off may not matter, but a prolonged illness may entail serious consequences. Here there is no negligence or lack of anxiety, and, on the whole, I believe that these cases do get most readily reported. Yet many cases, I have no doubt, escape us altogether; perhaps the majority.

It is easy to apply a test to these views. If it is found that a large proportion of the cases are not notified until after 20 days have elapsed from the onset of illness, and still more if a large proportion is not notified until after the lapse of 30 days, having regard to the numerous cases which do not last for these periods, we are in a position to assert with confidence that a large number of cases altogether escape our observation.

Here are the facts, all cases being recorded in which the interval exceeds 15 days, as such cases are usually infective before they are reported. The total number in which the interval exceeds 15 days is 92

The number in which the interval equals or exceeds 20 days is 74.
,, ,, ,, 30 ,, 22.
,, ,, ,, 40 ,, 12.
,, ,, ,, 50 ,, 8.

Many of these cases have gone about their duties in the earlier stages of their illness, some throughout.

It is useless to discuss further the reasons why they are not reported earlier. The delay is not always with the people, or not entirely. It rests also with the medical attendant in a number of instances.

What these figures prove beyond dispute, to my thinking, is that large numbers of Enteric cases are not notified at all.

Case	Intervals between the beginning of illness and notification exceeding 15 days	Subsequent	Sex	Age	Employment
8	19	......	m.	24	Labourer (Whitworth's)
9	27	......	m.	14	Waggoner (Colliery)
11	20	......	m.	35	Maker up (Cloth)
16	17	School ?	m.	4	Scholar (St. Patrick's)
20	25	....	m.	40	Hawker
30	17	......	f.	21	Finisher
33	23	......	m.	29	Cutler
34	16	......	f.	18	Kitchenmaid
35	20	......	m.	31	Wheelwright
38	19	+	m.	4	Scholar
49	30 ? ?	+ ?	f.	8	Scholar
55	60	......	m.	27	Baker
60	21	......	m.	5	Suffering from illness some months
63	27	......	f.	23	Rag Sorter
65	17	+ ? Overlooked Cases ?	m.	19	Maker-up
66	16	,, ,,	m.	15	Glassmaker

Case	Intervals between the beginning of illness and notification exceeding 15 days	Subsequent	Sex	Age	Employment
69	78	......	f.	42	Housework
76	23	......	m.	30	Carter (S)
77	25	......	m.	31	Engine Cleaner
79	34	......	f.	34	Charwoman
80	22	......	m.	10	Scholar
83 ō ?	29	......	f.	24	India-rubber Worker
84	21	......	f.	33	Cap Maker
85	21	......	m.	45	Moulder
86 —	20	......	f.	11	Probably Ulc. End.
89 =	28 ?	......	m.	23	Labourer
91	23	......	f.	18	Shirt Finisher
92	27	......	m.	7	Scholar
97	29	......	f.	30	Charwoman (8)
101	19	? +	f.	32	Home
104	19	......	f.	24	Publican
108	29	......	m.	26	Engine Fitter (out of work)
110	20	......	m.	31	Fitter
111	43	? +	f.	13	School
112	38	? +	f.	34	Housework
113	16	......	m.	18	Van Boy
116	17	? ? +	f.	19	Waitress
122	22	......	m.	22	Fireman
124	47	......	m.	26	Warehouseman
125	29	......	f.	33	Machinist and Home
131	31	......	f.	38	Charwoman and Home
134	28	......	m.	24	Moulder
135	66	......	m.	33	Fitter (Whitworth's)
136	22	+	f.	28	Canvasser
137	35	Neighbours ?	f.	21	Housework. Overlooked
150	68	......	m.	3	Overlooked case. Two others after
149	20	......	m.	26	Moulder
152 —	28	......	m.	9	?
160 + ?	25	......	m.	66	Labourer (Bellhouse's)
170	17	......	m.	8	Scholar
176	24	......	f.	24	Machinist
177	19	......	m.	30	Carter
179	20	+ 176	m.	16	Point Boy
187	17	+ 176 — 179	f.	27	Iron Turner
183	21	......	f.	17	Tentsorter
186	21	......	f.	28	Maker-up
206	16	School ?	f.	10	Moston Lane Board School
213 O	17	......	m.	62	Labourer (I)
215 O	18	......	m.	17	Labourer (N) (5)
216	20	......	m.	15	Clerk
219	43	School ?	f.	9	Moston Lane Board School
221 —	56	......	m.	18	Labourer
237	23	......	m.	21	Fish Curer
239	20	......	f.	25	Housework
242	19	......	m.	44	Foundry Labourer
246	59—65	......	m.	13	Overlooked Scholar
249	20	......	f.	28	Housework
258	28	......	m.	30	Traveller
259	19	......	m.	32	Shoemaker
271	20	......	m.	25	Grocer's Salesman
274	29	......	m.	11	School
275	21	+	f.	18	Servant
279	17	+	f.	6	Schoolgirl
287	25	......	m.	15	Fruit Sorter

Case	Intervals between the beginning of illness and notification exceeding 15 days	Subsequent	Sex	Age	Employment
284	22	......	f.	49	Housework
285	20	......	f.	45	,,
295	41	......	f.	22	Servant (Hotel)
299	24	......	m.	22	Labourer
304	27	......	f.	45	Housewife
308	20	......	m.	42	Agent (Singer's)
312	21	......	f.	19	Housework
314	34	......	f.	7	School
317	30	+	f.	7	,,
319	28	+	m.	4	Home
341	54	......	m.	2½	Overlooked
332	33	......	m.	32	Furnaceman
321	21	......	f.	18	Dopper
323	26	......	f.	29	Traveller
330	81	......	f.	16	Tobacco Spinner
334	38	......	f.	31	Housework
342	30	+	m.	14	Scholar
344	16	+	f.	13	Scholar

The foundations of our statistical inferences, therefore, come under doubt.

It was, however, necessary to establish firmly the fact that very many cases escape attention with a view to understand the further discussion of the data·

And it is desirable also to emphasise the fact that many cases of Enteric Fever occur, the entire duration of which does not exceed 14 days.

Although, however, it is probable that the number of children attacked by Enteric Fever is greatly underrated, it is still needful to explain why workers, and especially male workers, have so much heavier an incidence than women at home.

We have already seen that they probably consume shellfish to a much larger extent than women, and that part of the difference may be explained in this way. It is also probable that the workers get the lion's share of any salads used; and there is no doubt that working people do have a strong desire for watercress and other salads.

Another matter is worth considering. The male worker also gets the chief share of the beer, and, though I do not care to draw too positive a conclusion, it does appear that the men attacked are on the whole of that class who would use a good deal of beer.

The question arises whether previous catarrhal conditions may not pave the way for an attack in a certain proportion of cases.

Then, of course, assuming that a number of persons remain at work while suffering from Enteric Fever—and we have proved that a number of our cases do so remain for a part of their infective period—they will have added opportunities of infecting other workers, and these in turn will have added opportunities of receiving infection.

There are, it will be seen, provable differences between workers, and especially between male workers, and women employed at home, and there are also conjectural differences. It would, however, be more satisfactory if the results of these differences could be clearly demonstrated, case by case.

Propagation in Places of Work from Shops, &c.

When the sanitary inspector fills up his enquiry form in respect of any disease, he records not only the character of work pursued by the patient, and his or her place of employment, but also like particulars for every employed person and for every scholar in the house.

It should, therefore, be possible to ascertain the influence not only of cases before their disease is recognised in spreading any illness amongst their fellow-workers, but also the influence of contacts from houses known to be infected.

We have already seen that there is reason to believe that closets used by infected persons serve to transmit the disease. We might reasonably expect, therefore, to obtain some evidence of this mode of conveyance in our large works; yet no such evidence is forthcoming. It should be said, however, that the persons working in these largely reside outside Manchester, and that cases may thus frequently be missed. Yet, allowing for this deduction, the paucity of multiple cases traceable to previous known cases is remarkable.

It is the same with the schools.

Housewives must often go to shops while suffering from Enteric, or in clothes saturated with infection, and the goods must be more or less infected, Yet no proof has been procured of transmission in this way. Often, also, infected persons must sell infected articles of food. Of this mode of conveyance also no proof is forthcoming.

Yet, in this class of case, the reason must be because the chain of evidence is incomplete, not because the disease is not thus conveyed.

I am obliged to conclude, however, that transmission in schools and works by cases or contacts is not the most frequent mode of conveyance, though it must occur. As regards local shops, I have a different impression. These I suspect to exercise a decided influence.

Exhaustive enquiry, however, has failed to yield much positive result.

This being premised, it may be useful to give a few leading facts relating to occupations.

Contacts.

1. Schools. The number of schools at which contacts attended was 69; the number in which cases occurred was 28.

In several of these, as, for example, in St. Patrick's and in Moston Board School, the cases occur in such a manner as to suggest school infection, but when the individual cases are examined this suggestion is found to be inadmissible.

There is, however, some reason to suspect that isolated cases may have been due to contacts in 4 schools.

In 5 schools 3 contacts attended, and in one 5 contacts, without any case of Enteric being reported amongst the scholars.

2. Contacts engaged in making of cloth garments, shoes, clogs, etc. These number 102.

No case was traced to any of them.

3. Contacts who were laundresses, charwomen, etc. These number 12.

4. Provision dealers, greengrocers, waiters, publicans, bakers, butchers, hawkers, milkmen, etc., etc. These number 28.

5. Numerous women employed at home, and often nursing cases of Enteric.

6. Contacts on railways, tramcars, etc.

From none of these was it possible to trace infection.

Attacks.

1. The number of cases of Enteric Fever engaged in making garments, or in manufacturing cotton thread or cloth, in tailoring, in rubber making, in making caps, shirits, corsets, shoes, etc, and in dyeing, number 45.

Only two of these were cotton workers, and there were no cases among weavers.

There is a possibility of the disease having been transmitted at the place of work in 3 instances.

2. Laundry women, 3 cases; charwomen, 3 cases.

There is no evidence as regards infection from clothes, or of conveyance from these cases.

3. Dealers in provisions, publicans, fish curers, fish salesmen, etc., 18—a large number. These will be separately considered. There is here a probability, and some indication, of spread.

4. Children not yet at school, 13. Of these, 6 are traced to previous cases, and 3 may not be Enteric.

5. School children under 14 number 62. There is slight evidence that the disease may have been conveyed in two or three schools.

6. Ironworkers 14. Other metals 1. Slight evidence of spread.

7. Other classes of male workers 36. There is no evidence of spread from these while at work.

The known facts as regards the origin of the attack in these groups are exhibited in the following table :—

	All cases	Traced definitely or probably to a previous attack at home	Having consumed shellfish raw or cooked antecedent to their attack
Workers in cloth, clothing, etc.	43	5	6
Nurse, laundress, charwomen	7	1	0
Provision dealers, etc.	18	0	9
Ironworkers, etc., and labourers	23	1	9
Other labourers	21	2	5
Other occupied males	36	3	7
Housewives	45	14	7
Children under 14	74	36	3
Total	267	62	46

The high proportion of instances in which the source of infection of the children could be traced is interesting.

Housewives stand, in this respect, intermediate between children and workers.

The high proportion of instances in which provision dealers consumed shellfish antecedent to their attack, and the failure to trace their attack to previous cases, are noteworthy circumstances.

Ironworkers present a similar picture.

The same general features are notable in regard to labourers and other occupied males.

The groups comprising housewives and children deserve again to be noticed. It cannot be doubted that many cases are overlooked, and it is certain that friendly visits are often paid from one house to another. In this way, no doubt, infection is often conveyed from one house to another.

The group designated provision dealers deserves special attention. It cannot be said of any one of these cases that there was no danger of infection from the attack. Four of them were, however, in the employ of large firms, and it would be hopeless to attempt to trace cases to them.

In the following cases, however, it should be possible to find some evidence of infection in customers: (55) a baker, (127 and 243) greengrocers, (193) a confectioner, (295) a hotel servant, later at a confectioner's.

In the cases of 55 (a baker), 287 (a fruit sorter), and 271 (salesman to a large firm of grocers), the persons attacked continued at their work throughout the whole course of their illness. In the cases 287 and 271, however, it would scarce be possible to trace cases to which they may have given rise.

As regards case 55, a baker working in Openshaw, this man took ill about January 9th, and his case was notified on March 9th, he having been at work up to March 2nd. With one doubtful exception, no cases are notified from Openshaw up to April, and these too late to have been infected by bread handled by this man. Five cases, however, occur in April, and it is possible that these were due to case 55, through the medium of overlooked attacks. This is not a merely fanciful suggestion. Having regard to the population, there is no such outbreak at this period in any other sanitary district except St. George's, in which the disease was persistent throughout the year. No other source was found for these five cases.

Case 127, a greengrocer in district A, was attacked with Enteric Fever on May 14th, and was removed to hospital on May 28th. The family contained eight members. The shop is in a main thoroughfare, is a fairly large one, and has a conspicuous position. It is no doubt largely frequented by persons in the neighbourhood. This man was discharged from hospital on July 12th, and on September 24th his wife failed with Enteric Fever.

No intermediate cases are notified. It is, of course, possible that the husband infected the wife after discharge. It is, however, a rare occurrence, and the interval is a long one.

It is, in the light of other experiences, more likely that some other member of the family developed an overlooked attack of Enteric Fever in the interval.

No cases occur in this district in June, but in July, August, and September a number of cases occur, most of them grouped, so that they would be likely to pass this shop, and situated around it. Three of the cases are traced to a previous overlooked attack of Diarrhœa in a child, æt. 3, who may be supposed to have taken ill about the end of July. One other attack in a woman was, no doubt, due to a previous attack in her child, æt. 6. Another attack was not Enteric Fever, but Peritonitis.

Regrouping the cases, then, we have four attacks in June, two in August, and four in September.

The persons attacked were two boys at work, æt. 14 and 15, two men, four women (of whom two were working, and two were housewives), and two children.

So far as this analysis goes, it somewhat increases the likelihood of spread from the shop, since men do not affect fruit to the extent that they do shellfish and salads.

Further, in no other sanitary district do we have a localised outbreak beginning in July. It is true there are two cases in July in the adjoining district of Bradford, but there are none in August.

The character of the evidence, then, pointing to this shop is very similar to that relating to the previous occurrence in Openshaw.

In view, however, of the importance of this instance, Mr. Hewitt has investigated the circumstances somewhat fully.

The following are the most important facts elicited :—

The greengrocers in question no longer live in the same district. They strongly deny that there was any case of illness intermediate between the husband's attack commencing in May and the wife's in September. It should be said that the father of the child at 3 James Street (who infected his father and two women in adjoining houses) is a nightsoilman, and it is worth remembering that he may have carried infective matter by his boots from the midden at the greengrocer's shop, or from 7 Chapel Street, or from any other case at whose house the midden required emptying, to his own house, and to the ground near other houses. This is one way by which Enteric Fever is probably propagated to some extent.

Case 252 had fruit from the suspected shop it is true, but he also flew pigeons behind the middens of 1, 3, and 5, James Street, and the pigeons would alight on the infected middens.

Cases 163 and 190, of 7 Chapel Street, were, no doubt, infected from previous unrecognised cases in the house, one of which began to be ill so far back as March 7.

Case 211 untraced.

Case 235 untraced. Flies very numerous.

Case 165 purchased fruit at the suspected shop.

Case 174 from case 165 (?)

Case 240 worked with the wife of case 211, whose person and clothing must have been to some extent infected, used the same closet, hung her shawl in the same room, etc. She did not purchase fruit from the suspected shop.

Case 175 untraced.

The above enquiry does not destroy the likelihood that the shop had to do with the spread of Enteric Fever, though it opens out one or two interesting additional possibilities, and modifies the extent to which the shop could have been concerned.

Case 295 was a servant at a hotel in District B, and took ill in October. While at this hotel she infected her sister, who lived at a confectionery shop. She then went home to her mother's, who was afterwards seized with an illness which looked like an attack of Enteric Fever. The disease, which had gone down in this district in November, again increased in December to four cases. Two of these, however, are traceable to previous attacks, and it cannot be said that there is any evidence of spread from this shop.

Case 193 was at a confectioner's shop. There was no spread from here.

These cases may serve to draw attention to the important part which provision dealers may play in the extension of Enteric and other Diarrhœal diseases unless sufficient precautions are taken.

Study of Seasonal Distribution in the different Sanitary Districts.

Let us now study the manner in which Enteric Fever occurs in the different districts of the City at different seasons of the year. I have recorded the number of cases commencing in each month of the year for each of the five years 1900–1904, distinguishing those which have given a + ve reaction from those in which the reaction has been negative or has not been obtained.

When this is done we see that in 1900 there is a marked increase in the City generally in the month of August.

There are, however, variations as regards the period and extent of incidence on different districts.

In the Central District there is a slight increase from February to May.

In St. George's there is an increase in January and February and again in April.

In Ardwick, 6 cases occur in January, and 8 in April, May, and June, while only 6 occur in August, September, and October.

In Hulme there is marked prevalence in January, February, March, and April, culminating in April with 11 cases, while in August only 4 occur.

The autumnal rise in this district, and also in the adjoining district of Chorlton-on-Medlock, begins in October. Such is also the case in West Gorton.

In Openshaw, March, April, and May show a marked increase exceeding the autumnal one.

Increase occurs in this year, however, in August in Ancoats, Central, St. George's, Cheetham, Harpurhey, Newton, Bradford, Beswick, Ardwick, Openshaw, and Hulme.

But a very striking feature of this year is the general fall in each district in September, to be again followed by a general rise in October.

The marked rise in August is similarly preceded by a very small number in each district in July.

It would seem plain that in the above year shellfish (that is to say mussels, so far as Manchester is concerned) could have had practically no share in the causation of the autumnal rise, though indeed the fact that the autumnal rise frequently commences early in August goes to prove the same thing.

1901.

There is marked uniformity in the manner in which Enteric Fever prevails throughout this year.

In no district is there shown any tendency to partial increase in the first seven months of the year, except, perhaps, slightly in Bradford in March, April, May, and June.

A general ascent occurs in August, and is maintained in September and October.

The extent and manner vary, but the aggregate results are most notable in Ancoats, Central, St. George's, Harpurhey, Newton, Bradford, Clayton (where the rise is a month late), Openshaw, and West Gorton.

1902.

This year, however, presents altogether a different picture. Ancoats exhibits one series of cases, numbering 14, from April to July. In October and November again 11 cases occur. In the Central district the greatest incidence of the year is in February, March, and April. The autumnal increase is almost wanting. In St. George's, as in 1904, the disease is prevalent, with breaks, throughout the year, and is divisible into three occurrences, the first from January to April, the second in June and July, and the third in October and November.

The autumnal increase is slight in Cheetham, Crumpsall, and Blackley, while in the first six months of the year there is only one case in the three districts.

In Harpurhey, one case occurs each month up to June, when there are two, then in July four. In August, there are three, and in September and October four each.

In Newton the disease begins in May, and maintains its ground to September. In September, October, and November a marked burst occurs.

In Bradford, increases occur in April and August. After August, however, the incidence is slight. In Beswick, a sharp burst of seven cases occurs in April. Throughout the rest of the year there are few cases. In Clayton, there is no marked incidence. In Ardwick, three cases occur in March and four in June, while in September and October eight cases occur.

In Openshaw, West Gorton, Rusholme, and Chorlton-on-Medlock there are very few cases up to September. In the first three, however, there is marked incidence in September, October, and November.

In Rusholme the disease remains slight throughout. This is the case also in Chorlton-on-Medlock, except that September and December each yield five cases.

In Hulme, marked incidence occurs in May and June, and again in October and December.

In spite of this variation in the aggregate, there is marked increase in September, October, and November. Yet the number in April exceeds the number in November.

1903.

This year again presents marked variations. Enteric Fever is prevalent in a moderate form in Ancoats throughout the year up to September, when it declines to one. True, four cases occur again in October, but this may have reference to what occurs in the adjoining district of St. George's.

In Central, there is a rise of no great amount in October and November.

In St. George's there is a somewhat low prevalence throughout the year, with a marked prevalence in September, October, November, and December.

In Cheetham four cases occur in January. The disease then remains low till October. In October and November eight cases occur.

In Crumpsall, Blackley, and Harpurhey there is almost complete absence of cases throughout. In Newton, Beswick, and Clayton the autumnal rise is almost absent.

In Newton, however, there is increased incidence from February to April and again from June to August.

In Beswick there is increased incidence in March and April.

In Ardwick there is marked incidence in February, March, April, May, and June. There is then decline till September, when marked incidence again occurs.

In Openshaw the autumnal rise is absent.

In West Gorton three incidences occur in February and March, again in August and September, and again in November.

In Chorlton-on-Medlock there is slight increase of incidence in January, February, and March, but the disease remains low throughout the rest of the year.

In Hulme there is slight incidence in January, again in May, but a distinct autumnal outburst occurs spreading over August, September, October, November, and December, the greatest incidence being in the last two months.

The picture presented by 1903 shows, then, the greatest possible diversity as to the times and modes in which the disease assails different districts. The aggregate effect is that the incidence on the whole city varies but little from month to month, though there is some increase in October, November, and December.

1904.

In Ancoats the most marked incidence is in January and February.

In Central there is little prevalence.

In St. George's, beginning with March, there is a striking outburst from April to July. Only one case occurs in August. In September the disease recommences with the same intensity.

In Cheetham there is marked incidence only in October, and these cases occurred in one family.

In Crumpsall, Blackley, Moston, Beswick, and Clayton there is very little Fever, and no autumnal rise.

In Bradford the autumnal rise is slight.

In Newton, however, there is marked incidence in November and December. This is due to direct infection.

In Openshaw there is marked increase in April; none in autumn.

In West Gorton there is marked incidence in July, August, and September—a subject already considered; none in October, November, December.

In Rusholme there is but one case after June.

In Chorlton-on-Medlock there is slight increase in October.

In Hulme there is marked incidence in January, March, August, October, and December.

There is not in this year, as in 1903, a marked uniformity of incidence from month to month.

The autumnal rise is marked in August, September, and October.

But the disease shows decided increments in January and again in March and April. These, however, are due largely to one district—St. George's.

OF THE YEAR.

Cases giving a positive re-action denoted by *. Cases giving a negative re-action, or no specimen of blood taken, denoted by †.

Statistical Divisions	January	February	March	April	May	June	July	August	September	October	November	December
Ancoats	*	**	***	***	****	**	****	***	*	****	...	***
	...	...	...	...	...	...	...	...	†	...	†	...
Central	*	*	*	...	*	**	**	*	*	****	***	*
	...	...	...	...	†	...	...	...	...	†	...	...
St. George's	**	****	****	***	...	***	***	**	********	*******	******	*****
	...	†	...	...	...	...	†	...	...	†	...	...
Cheetham	****	...	...	...	**	...	...	*	*	*****	***	*
	...	†	...	...	†	...	...	...	...	...	...	...
Crumpsall	...	...	...	*	...	...	*	...	...	...	...	*
	...	†	...	...	...	...	...	...	...	...	...	...
Blackley	...	...	...	...	*	...	...	...	...	...	*	...
	...	...	...	...	...	...	...	...	...	...	...	...
Harpurhey	...	...	...	...	*	...	*	*	...	...	...	...
	...	...	...	...	†	...	...	...	...	...	...	...
Moston	...	...	...	...	...	...	...	...	...	*	**	*
	...	...	...	...	...	...	...	...	...	...	...	...
Newton	...	****	***	***	...	**	******	**	...	**	*	**
	..	...	...	...	...	...	†	...	...	...	...	††
Bradford	...	*	*	*	...	***	*	...	*	*	****	***
	††	...	...	†	†	...	...	†	...	...	†	†
Beswick	...	...	***	****	...	**	*		...	...	...	*
	...	...	...	...	...	...	...	...	...	...	.	...
Clayton	...	...	*	*	...	*	...	...	...	..	...	...
	...	...	†	...	...	...	...	...	...	...	...	...
Ardwick	**	*******	***	*****	***	***	**	*	*	********	**	***
	...	...	...	†	†	...	...	...	...	†	...	...
Openshaw	***	*	...	***	...	**	...	...	***	*	*	...
	...	...	...	...	...	...	†	...	†	...	††	...
West Gorton	...	***	*****	*	***	*	...	***	******	*	**********	**
	...	...	...	...	...	†	...	...	...	†	†	...
Rusholme and Kirkmanshulme	...	***	...	*	***	*	*	***	...	...	*	...
	...	...	...	...	...	†	...	...	†	†	†	...
Chorlton-upon-Medlock	***	**	***	...	*	**	...	*	*	...	...	**
	...	...	...	†	..	†	...	...	†	††	...	...
Hulme	****	*	**	...	****	...	**	***	****	*****	*********	******
	...	...	†	...	†	...	...	†††	††	†	††	†

904.—Cases of Enteric Fever occurring in the different Districts of the City and at different Seasons of the Year.

Cases giving a positive re-action denoted by *. Cases giving a negative re-action, or no specimen of blood taken, denoted by †.

Statistical Divisions	January	February	March	April	May	June	July	August	September	October	November	December
Ancoats	*****	***	*	***	*	**	*	**	***	*	**	...
	†	...	...	...	...	...	...	...	...	†	...	...
Central	*	...	*	*	*	...	...	*	***	...	*	*
	...	...	...	...	...	...	...	†	...	...	...	...
St. George's	****	**	********	********	*****	***	********	*	**********	**	****	*****
	†	...	...	††	†	†	†	†	...	...	...	...
Cheetham	*	*	...	...	...	*	...	**	*	*****	**	...
	...	...	...	...	†††	...	...	†	...	†	...	...
Crumpsall	*	...	...	...	...	...	...	...	...	*	*	...
	...	...	..	...	...	††	...	...	...	...	...	†
Blackley	...	...	*	...	...	...	...	**	*	*	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Harpurhey	...	...	...	...	...	...	...	*****	*****	***	...	...
	...	...	...	...	...	...	...	...	...	...	...	...
Moston	...	...	**	...	...	...	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	. .	...	...	...
Newton	*	*	***	*	**	...	...	...	***	*	*****	****
	...	...	...	...	...	...	†	†	...	...	†	...
Bradford	...	...	...	**	...	...	**	...	**	*	***	***
	...	...	...	...	...	...	...	...	†	...	†	...
Beswick	**	**	*	...	...	...	...	*	**	*	...	...
	...	...	...	..	...	...	...	...	...	...	...	...
Clayton	*	...	...	...	...	...	...	...	...	...	*	...
	†	...	...	...	...	...	†	...	†	...	...	...
Ardwick	...	...	...	*	...	*	...	*	**	*	...	...
	...	†	†	...	...	...	†	...	...	...	...	†
Openshaw	***	...	...	*****	...	***	...	...	*	...	...	*
	†	...	†	...	...	...	...	...	...	†	...	...
West Gorton	...	...	...	*	**	...	***	*****	****	*	*	...
	†	...	...	†	...	...	...	†	††	...	...	...
Rusholme and Kirkmanshulme	...	...	...	**	**	*	...	*	...	...	...	...
	...	...	...	...	...	†	...	...	...	...	...	..
Chorlton-upon-Medlock	...	...	**	**	*	*	...	*	**	****	**	*
	...	...	...	†	...	...	...	...	...	...	†	...
Hulme	******	**	****	...	**	...	*	*********	*	*****	*	****
	...	...	†	...	†	...	†	†	†††	††	†	†

Cases of Enteric Fever occurring in different districts and at different seasons during 1900–1904 (cases giving a positive re-action +, cases giving a negative re-action or no specimens taken —).

1900

District		January	February	March	April	May	June	July	August	September	October	November	December
Ancoats	+	4	2	1	2	...	2	1	4	3	3	1	1
	—	...	...	...	...	...	1	...	.	...	2	...	...
Central	+	...	2	3	3	2	...	...	3	...	2	...	...
	—	1	...	...	...	...	...	...	...	1	...	...	...
St. George's	+	4	4	1	4	2	...	1	3	2	5	2	2
	—	...	...	1	1	...	2	...	...	...	...	5	...
Cheetham	+	1	3	...	1	1	1	...	4	2	3	2	1
	—	...	...	...	...	...	...	...	...	...	...	...	...
Crumpsall	+	1	3	...	...	...	...	...	...	...	...	...	...
	—	...	1	...	...	...	1	...	...	...	1	...	...
Blackley	+	...	...	1	...	...	...	...	...	...	5	2	1
	—	...	...	...	...	...	...	...	...	...	...	...	...
Harpurhey	+	2	2	2	1	..	1	...	3	...	5	2	...
	—	...	1	...	1	...	...	...	...	...	...	2	...
Moston	+	...	...	1	...	1	...	1	...	...	...	...	...
	—	...	...	...	...	...	...	...	...	...	...	1	...
Newton	+	3	...	1	3	...	...	2	4	1	4	...	...
	—	...	...	...	...	...	1	...	1	1	1	...	...
Bradford	+	3	...	1	1	...	...	1	3	2	1	...	...
	—	...	1	...	1	...	1	...	...	1	1	1	...
Beswick	+	...	...	...	...	...	1	...	3	...	...	...	1
	—	...	...	...	1	...	...	...	...	...	...	...	...
Clayton	+	...	2	1	1	...	...	...	...	1	3	...	...
	—	...	...	...	1	1	...	...	.	...	...	...	...
Ardwick	+	6	...	...	4	2	2	1	3	1	2	...	1
	—	...	...	...	...	...	..	...	...	...	...	...	...
Openshaw	+	2	1	4	4	2	2	1	3	1	3	2	...
	—	...	...	...	...	...	...	...	...	2	2	...	...
West Gorton	+	1	...	...	2	2	1	...	2	1	4	3	2
	—	...	...	...	...	...	1	...	...	1	...	...	1
Rusholme	+	1	...	...	...	...	...	...	...	2	1	2	...
	—	...	...	...	...	...	...	...	...	1	...	...	...
Chorlton-upon-Medlock	+	1	1	1	1	1	1	1	2	2	5	3	...
	—	1	...	...	1	...	1	...	...	...	1	...	2
Hulme	+	4	2	3	8	...	2	...	4	...	5	5	5
	—	...	...	...	2	...	...	...	...	...	...	1	2
City	+	33	19	23	35	13	13	9	41	18	51	24	14
	—	2	3	1	8	1	8	...	1	7	8	10	5

1901

District		January	February	March	April	May	June	July	August	September	October	November	December
Ancoats	+	1	...	3	1	1	1	3	5	5	9	2	2
	—	...	...	1	1	...	...	1	1	3	...	...	...
Central	+	...	...	3	1	...	1	1	2	5	4	3	3
	—	...	...	1	...	...	...	...	...	...	1	...	...
St. George's	+	4	1	...	2	...	...	...	4	6	3	1	1
	—	2	...	...	...	...	...	...	...	3	...	...	...
Cheetham	+	1	...	...	1	...	2	...	4	3	3	1	1
	—	...	...	...	1	...	...	...	...	...	...	...	...
Crumpsall	+	...	...	...	1	...	...	...	...	...	2	...	...
	—	...	...	...	...	...	...	...	...	...	1	...	...
Blackley	+	...	...	...	...	...	...	...	...	...	...	1	1
	—	...	...	...	...	...	...	...	...	...	...	1	1
Harpurhey	+	...	...	...	...	...	...	1	5	3	...	...	...
	—	1	...	...	...	...	...	...	...	1	...	1	1
Moston	+	...	1	...	...	...	...	1	1	1	1	...	...
	—	...	...	...	...	...	...	...	...	1	...	...	...
Newton	+	...	1	1	1	1	1	2	6	3	7	2	2
	—	...	...	...	1	...	1	...	...	2	2	2	2
Bradford	+	...	1	2	2	3	2	...	5	4	...	2	2
	—	...	...	...	...	...	...	1	...	3	1	1	1
Beswick	+	1	1	...	2	1	...	...	...	...	1	1	1
	—	...	...	...	...	...	...	1	...	...	..	...	...
Clayton	+	1	...	...	...	...	1	...	1	3	5	4	4
	—	...	...	...	...	1	...	...	1	1	...	...	...
Ardwick	+	1	...	...	...	...	...	1	3	3	4	1	1
	—	...	1	...	1	...	...	...	...	...	...	1	1
Openshaw	+	...	...	1	...	...	2	...	6	7	6	1	1
	—	...	...	...	...	1	...	...	2	1	1	1	1
West Gorton	+	...	1	...	3	...	...	3	6	5	5	...	...
	—	...	...	...	...	...	1	...	2	1	1	2	2
Rusholme	+	..	1	1	...	...	1	1	.	1	1	2	2
	—	...	...	...	...	...	...	1	...	...	...	1	1
Chorlton-upon-Medlock	+	1	1	...	...	1	1	1	2	4	4	1	1
	—	...	...	...	...	...	1	1	1	...	...	...	...
Hulme	+	3	1	1	1	1	...	1	3	4	4	3	3
	—	...	1	1	1	...	...	...	...	2	2	...	...
City	+	13	9	12	15	8	12	15	53	57	59	25	25
	—	3	2	3	5	2	3	5	7	18	9	10	10

1902

District		January	February	March	April	May	June	July	August	September	October	November	December
Ancoats	+	...	1	...	4	2	3	5	...	2	7	4	1
	—	...	...	1	...	...	...	1	...	...	1	...	...
Central	+	2	4	5	4	1	3	...	3	1	2	...	...
	—	...	...	...	...	...	1	1	1	...	...	...	...
St. George's	+	4	4	3	5	1	5	4	2	4	2	5	5
	—	...	...	...	1	...	...	...	...	1	1	...	...
Cheetham	+	...	...	...	1	...	...	1	...	1	3	2	...
	—	...	...	...	...	...	...	...	...	1	...	1	1
Crumpsall	+	...	...	...	...	...	...	1	2	1	1	1	1
	—	...	...	...	...	...	...	...	...	...	...	...	...
Blackley	+	1	...	...	...	...	...	...	...	...	...	...	...
	—	...	...	...	...	...	...	1	...	...	...	...	...
Harpurhey	+	...	1	1	1	1	2	2	3	4	4	1	...
	—	...	1	...	...	1	...	...	...	...	...	...	...
Moston	+	...	...	2	...	...	...	...	1	1	1	...	..
	—	...	...	...	...	...	...	...	...	...	...	...	...
Newton	+	2	...	...	...	2	2	3	2	5	6	8	2
	—	...	...	...	...	1	1	...	1	...	1	..	...
Bradford	+	2	...	2	4	...	...	...	4	1	1	2	1
	—	...	...	...	1	...	...	1	...	2	...	...	1
Beswick	+	1	2	...	7	1	1	...	1	3	...	...	3
	—	...	...	...	...	1	...	1	...	...	...	...	1
Clayton	+	3	...	1	...	...	1	1	...	2	1	1	...
	—	...	1	...	...	...	...	1	...	1	...	...	...
Ardwick	+	...	...	3	1	2	4	1	2	3	5	2	3
	—	...	...	3	...	...	...	...	2	...	...	...	...
Openshaw	+	1	1	1	...	...	...	...	1	5	3	1	...
	—	...	1	...	...	...	...	1	...	...	...	...	...
West Gorton	+	1	1	...	2	...	...	1	2	6	6	3	1
	—	...	...	...	...	...	1	1	...	...	...	...	...
Rusholme	+	...	...	...	1	...	...	...	...	...	2	...	...
	—	...	...	...	...	...	1	...	...	...	...	...	...
Chorlton-upon-Medlock	+	1	1	...	2	...	...	...	...	5	1	...	5
	—	1	1	1	...	...	...	...	1	1	...	...	2
Hulme	+	1	1	...	1	3	6	2	3	...	4	1	4
	—	...	1	1	...	...	1	...	1	2	...	...	1
City	+	19	16	18	33	13	27	21	26	44	49	31	26
	—	1	5	6	2	3	5	8	6	8	3	1	6

1903

District		January	February	March	April	May	June	July	August	September	October	November	December
Ancoats	+	1	2	3	3	4	2	4	3	1	4	...	3
	—	...	...	...	...	...	...	...	...	1	...	1	...
Central	+	1	1	1	...	1	2	2	1	1	4	3	1
	—	...	...	...	...	1	...	...	...	...	1	...	...
St. George's	+	2	4	4	3	...	3	3	2	8	7	6	5
	—	...	1	...	...	...	...	1	...	...	1	...	...
Cheetham	+	4	...	...	...	2	...	...	1	1	5	4	1
	—	...	1	...	...	1	...	...	...	...	...	...	...
Crumpsall	+	...	...	...	1	...	...	1	...	...	...	...	1
	—	...	1	...	...	...	...	..	...	...	...	...	...
Blackley	+	...	...	...	...	1	...	...	...	...	..	1	...
	—	...	...	...	...	...	...	...	...	...	...	...	...
Harpurhey	+	...	...	...	...	1	...	1	1	...	...	...	...
	—	...	...	...	...	1	...	...	...	...	...	...	...
Moston	+	...	...	...	...	...	...	...	...	...	1	2	1
	—	...	...	...	...	...	...	...	...	...	...	...	...
Newton	+	...	4	3	3	...	2	6	2	...	2	1	2
	—	...	...	...	...	...	...	1	...	...	...	...	2
Bradford	+	...	1	1	1	...	3	1	...	1	1	4	3
	—	2	...	...	1	1	...	...	1	...	...	1	1
Beswick	+	...	...	3	4	...	2	1	...	...	...	...	1
	—	...	...	...	...	...	...	...	...	...	...	...	...
Clayton	+	...	...	1	1	...	1	...	...	...	...	...	...
	—	...	...	1	...	...	...	...	...	...	...	...	...
Ardwick	+	2	7	3	5	3	3	2	1	1	8	2	3
	—	...	...	...	1	1	...	...	...	...	1	...	...
Openshaw	+	3	1	...	3	...	2	...	...	3	1	1	...
	—	...	...	...	...	...	...	1	...	1	...	2	...
West Gorton	+	...	3	5	1	3	1	...	3	6	1	10	2
	—	...	...	...	...	...	1	...	3	...	1	1	...
Rusholme	+	..	3	...	1	3	1	1	3	...	...	1	...
	—	...	...	...	...	...	1	...	...	1	1	1	...
Chorlton-upon-Medlock	+	3	2	3	...	1	2	...	1	1	...	...	2
	—	...	...	...	1	...	1	...	...	1	2	...	...
Hulme	+	4	1	2	...	4	...	2	3	4	5	9	6
	—	...	...	1	...	1	...	...	3	2	1	2	1
City	+	20	29	29	26	23	24	24	21	27	39	44	31
	—	2	3	2	3	6	3	3	4	6	8	8	4

1904

District		January	February	March	April	May	June	July	August	September	October	November	December
Ancoats	+	5	3	1	3	1	2	1	2	3	1	2	...
	—	1	...	...	...	...	...	...	..	...	1	...	...
Central	+	1	...	1	1	1	...	...	1	3	..	1	1
	—	...	...	...	...	...	...	...	1	..	...	...	...
St. George's	+	4	2	8	8	5	3	8	1	10	2	4	5
	—	1	...	...	2	1	1	1	1	...	...	...	...
Cheetham	+	1	1	...	...	...	1	...	2	1	5	2	...
	—	...	...	...	...	3	...	...	1	...	1	...	...
Crumpsall	+	1	...	...	...	...	...	...	...	...	1	1	...
	—	...	...	...	...	...	2	...	...	...	...	...	1
Blackley	+	...	...	...	...	...	...	...	2	1	1	..	...
	—	...	...	1	...	...	...	...	...	...	...	...	...
Harpurhey	+	...	...	...	...	...	...	...	5	5	3	..	...
	—	...	...	...	...	...	...	...	...	...	...	...	...
Moston	+	...	...	2	...	...	...	...	...	...	...	...	...
	—	...	...	...	...	...	...	...	...	...	...	...	..
Newton	+	1	1	3	1	2	...	...	...	3	1	5	4
	—	...	...	...	...	...	...	1	1	...	...	1	...
Bradford	+	...	...	...	2	...	...	2	...	2	1	3	3
	—	...	...	...	...	...	...	...	...	1	...	1	...
Beswick	+	2	2	1	...	...	...	...	1	2	1	...	...
	—	...	...	...	...	...	...	...	...	...	...	...	...
Clayton	+	1	...	...	...	...	...	...	...	...	...	1	...
	—	1	...	...	...	...	...	1	...	1	...	...	...
Ardwick	+	...	...	...	1	...	1	...	1	2	1	...	...
	—	...	1	1	...	...	...	1	...	...	...	...	1
Openshaw	+	3	...	...	5	...	3	...	...	1	...	...	1
	—	1	...	1	...	...	...	...	...	...	1	..	...
West Gorton	+	...	...	...	1	2	...	3	5	4	1	1	...
	—	1	...	...	1	...	...	...	1	2	...	...	...
Rusholme	+	...	...	...	2	2	1	...	1	...	...	...	...
	—	...	...	...	...	...	1	...	...	...	...	...	...
Chorlton-upon-Medlock	+	...	...	2	2	1	1	...	1	2	4	2	1
	—	...	...	...	1	...	...	...	...	...	...	1	...
Hulme	+	6	2	4	...	2	...	1	8	1	5	1	4
	—	...	...	1	...	1	...	1	1	3	2	1	1
City	+	25	11	22	26	16	12	15	30	40	27	23	19
	—	5	1	4	4	5	4	5	6	7	5	4	3

There is great variation in the times and extent to which different districts are affected.

I here introduce two of these table pictures, as I have called them, so as to show how clear a picture they give of the incidence of Enteric Fever on the different districts in successive months. For the other years the facts are exhibited in figures. See pp. 151 and 152.

On a review of these tables, then, we find that :—

1. Strictly local rises are apt to occur at all periods of the year.

2. They generally extend over two or three months, but may be limited to one, in which case infection in one family may be the cause.

3. Such local rises occur in the first six months of the year 1900 in five districts, in 1901 in one district, in 1902 in seven districts, in 1903 in six districts, and in 1904 in four districts.

4. These rises do not agree with each other in extent or in time.

5. There is generally a marked increase of cases in Autumn. More districts become affected, and the number of cases increase

6. Even this, however, is partial. The increases in different districts do not commence in the same months. They are of very unequal extent, and generally they do not affect all districts. Moreover, they do not necessarily affect the same districts in successive years.

Thus, in 1900, the autumnal increase is practically missed in the following sanitary districts, Central, Crumpsall, Moston, Bradford, Beswick, Ardwick, and Rusholme.

In all, it is interrupted in September. In Blackley, it commences in October.

In 1901 it is missed in Crumpsall, Blackley, Moston, Beswick, and Rusholme. In all the others it begins in August.

In 1902 it is missed in Central, Crumpsall, Blackley, Moston, Beswick, Clayton, and Rusholme.

In Ancoats and Cheetham it begins in October; in Harpurhey in June; in Newton in May, becoming intensified in September. In Bradford it affects only August. In Ardwick it begins in August, though there is no distinct remission after March.

In Openshaw and West Gorton it begins in September. In Chorlton-upon-Medlock rises occur in September and December, and in Hulme in October.

In 1903 the autumnal rise is missed in Crumpsall, Blackley, Harpurhey, Newton, Beswick, Clayton, Openshaw, Rusholme, and Chorlton-upon-Medlock,

The rise begins in Central in October, in St. George's in September, in Cheetham in October, in Bradford in November, in Ardwick in October, in West Gorton in August, in Hulme in July.

In 1904 the autumnal rise is missed in Ancoats, Central, Cheetham (one family), Crumpsall, Blackley, Moston, Beswick, Clayton, Ardwick, Openshaw, and Rusholme.

7. These data taken together strongly suggest the action of local influences throughout.

They quite exclude the operations of any general cause, except in so far as such a cause can intensify the action of the forces already at work in the district, and operative in a lesser degree at other seasons of the year.

They exclude the operation of the water supply. They render the action of the milk supply but little likely.

They do not exclude the action of shellfish, though they diminish its likelihood as a potent factor.

They suggest that the autumnal increase is obtained by the addition of a series of purely local and limited increases, and that the factors at work extend over a limited space.

8. Among other factors aiding the autumnal increase which suggest themselves the more obvious are—

(*a*) The higher temperature of the soil may favour the longer viability of the typhoid bacillus, and may even subserve its growth.

(*b*) The autumnal increase may be due to the great numbers of the housefly present when the increases first take place.

(*c*) Contaminated fruit and shellfish may play a distinct part in spreading the disease.

The autumnal rise in Manchester is, however, never very great.

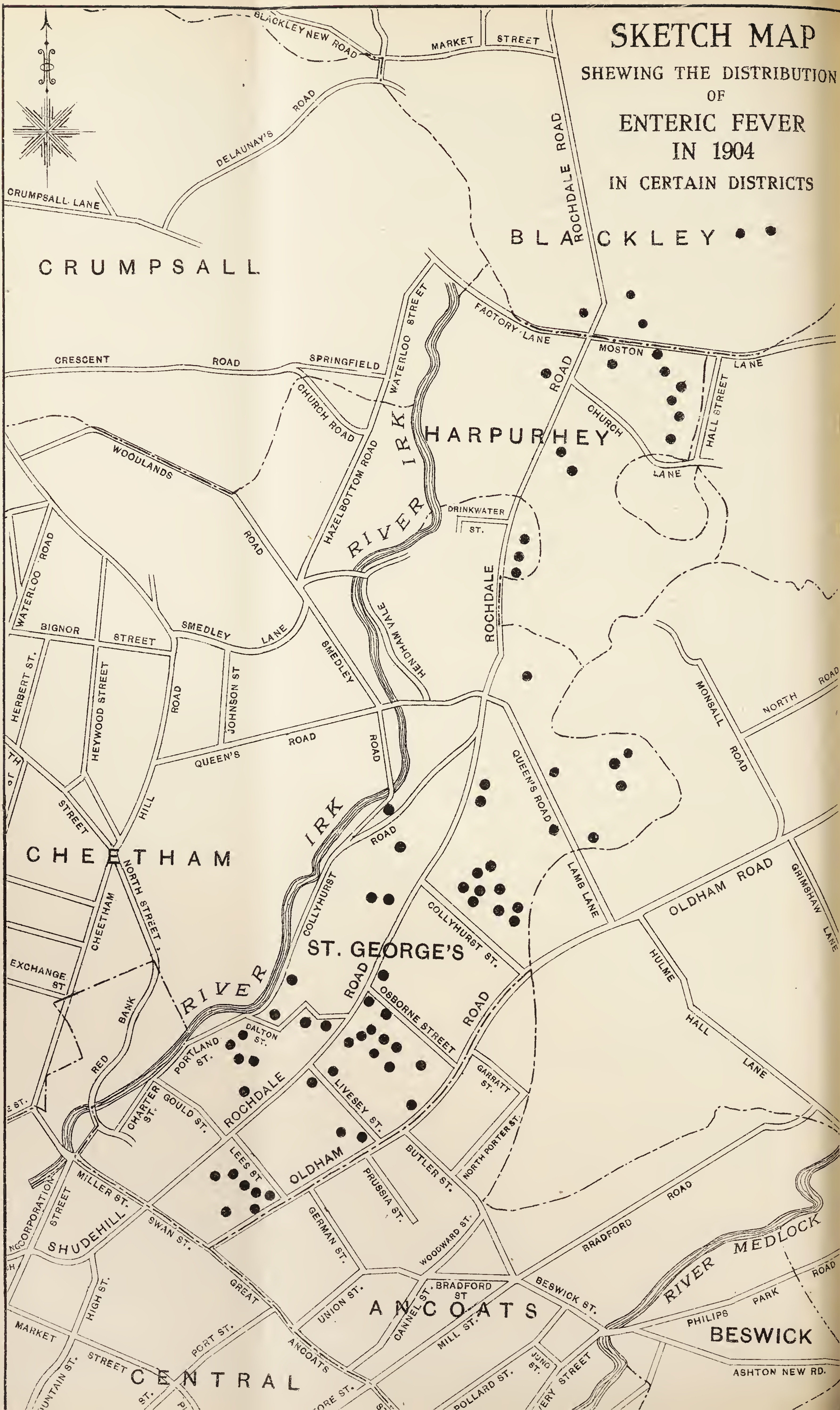
It bears no relationship to the magnitude of the Diarrhœa curve.

Hence, if the housefly is to any considerable extent responsible for the Diarrhœa rise, to that extent doubt is aroused as to the influence of houseflies in causing the increase in cases of Enteric Fever. It occurs rather long after the advent of flies in numbers.

Without, therefore, denying that the housefly has to do with the autumnal rise, one is led to think that it cannot be the main cause, but only a subsidiary one.

We have seen in former reports that there is a curious definiteness about the rise of the Enteric curve. In many instances a sharp rise occurs definitely in a particular week, and the increase persists. This may occur prior to the shellfish season.

There is a tendency for this rise in the number of cases, commencing in a particular week, to be 2, 3, 4, or 5 weeks after the rise in the number of deaths from Diarrhœa.


SKETCH MAP
SHEWING THE DISTRIBUTION OF
ENTERIC FEVER
IN 1904
IN CERTAIN DISTRICTS
BLACKLEY NEW ROAD
MARKET STREET
DELAUNAY'S ROAD
CRUMPSALL LANE
CRUMPSALL
ROCHDALE ROAD
BLACKLEY
FACTORY LANE
MOSTON LANE
HALL STREET
CHURCH LANE
CRESCENT ROAD
SPRINGFIELD
CHURCH ROAD
WATERLOO STREET
HAZELBOTTOM ROAD
RIVER IRK
HARPURHEY
DRINKWATER ST.
WOODLANDS ROAD
WATERLOO ROAD
BIGNOR STREET
SMEDLEY LANE
SMEDLEY ROAD
HENDHAM VALE
ROCHDALE ROAD
HERBERT ST.
HEYWOOD STREET
ROAD
JOHNSON ST
QUEEN'S ROAD
MONSALL ROAD
NORTH ROAD
STREET
HILL
QUEEN'S ROAD
CHEETHAM
NORTH STREET
CHEETHAM
COLLYHURST ROAD
LAMB LANE
OLDHAM ROAD
GRIMSHAW LANE
COLLYHURST ST.
ST. GEORGE'S
EXCHANGE ST
RED BANK
RIVER
HULME HALL LANE
OSBORNE STREET
ROAD
DALTON ST.
PORTLAND ST.
ROCHDALE
GARRATT ST.
CHARTER ST.
GOULD ST.
LIVESEY ST.
NORTH PORTER ST.
BUTLER ST.
LEES ST
OLDHAM
PRUSSIA ST.
MILLER ST.
STREET
SHUDEHILL
SWAN ST.
GERMAN ST.
WOODWARD ST.
BRADFORD ROAD
RIVER MEDLOCK
HIGH ST.
GREAT ANCOATS
UNION ST.
CANNEL ST.
BRADFORD ST
ANCOATS
BESWICK ST.
PHILIPS PARK ROAD
BESWICK
MARKET STREET
PORT ST.
MILL ST.
POLLARD ST.
ASHTON NEW RD.
CENTRAL

It may be that the rise is due to the fact that in the Diarrhœal season Enteric Fever is cloaked by Diarrhœa.

Cases of Enteric Fever get overlooked, being, especially in children, regarded as Summer Diarrhœa. The disease thus spreads more readily from one house to another. The tendency is increased by the fact that in August it is the school vacation, and the children go more freely to one another's houses.

In consequence, probably the mothers take more interest in the illnesses of their neighbour's children.

The increase in the number of overlooked attacks will tend to go on for some time after Diarrhœa has become epidemic, although the number of cases overlooked must be irregular, being dependent on the antecedent cases of Enteric, and on the class of houses in which they occur.

It is to be expected then that Enteric Fever will increase from this cause in an irregular manner.

When, however, such overlooked cases do occur in young children, and as they continue to increase, it is likely that the housefly will have access to the infected fæces, and will help to disseminate the disease.

We have seen that, though the aggregate effect is, usually, an increase of Enteric Fever over the whole City in August, September, and October, this is due to the addition of a series of local increases in different districts, which are not coincident in their commencement or decline.

It is the more curious that, in many years, the number of cases should go up abruptly in a particular week, for the whole City.

It is possible that the number of Enteric attacks mistaken for Diarrhœa is a large factor in the autumnal increase.

All that we can positively assert, however, is that the factors are local in their action.

With this limitation, however, there might be direct transmission from person to person, aided in the Autumn by growth or persistence of the bacillus in the soil, by an increase of overlooked cases, by the action of houseflies, by batches of infected shellfish, and by fruit infected before arrival and afterwards.

Map showing Enteric Cases in St. George's in 1904.

It has appeared to me that it might be worth while to study on a map the local distribution of cases in the district most affected—viz., St. George's. We have already seen that the distribution of the rise in July, August, and September, in West Gorton, was limited in extent.

The large number of cases occurring in St. George's, in 1904, renders that district a specially interesting study. I have also added the cases occurring in Harpurhey. These were originally quite unconnected, but Mr. Hewitt has since traced a few of them to their probable source of infection.

The picture presented by this Map is a striking one. It is that of four distinct nests of Enteric Fever in St. George's, and of one in Harpurhey. It cannot be doubted that the infection in each of these nests has proceeded on strictly local lines.

Largely, no doubt, infection has been from house to house, and from person to person. Partly also shops or other local causes may be involved.

In St .George's it will be seen on reference to the Picture-table for 1904, the questions of autumnal increase, houseflies, shellfish, etc., do not enter. The propagation goes on during 1904, irrespective of such aids, all through the year.

It is now seen that it went on from four different foci, each maintaining its own process of local infection.

If, however, a limited local process of infection is capable of producing such a succession of cases, and the enquiries made into individual cases prove that this is at least partly so, then a presumption is created that the local increases in other districts own a similar origin, and other factors become in a sense secondary.

Discussion of the Influence of persistence of Typhoid Infection in the soil, as an explanation of the autumnal rise.

In preceding reports it has been noted that from the enquiries made by Dr. Robertson, now Medical Officer of Health for Birmingham, it seemed possible that under favourable conditions the bacilli of Typhoid Fever might multiply in favourable situations in the superficial layers of the soil, and come to the surface in the warmer season.

It was noted that the sharp increase in Enteric Fever, which often takes place in a particular week in Autumn, tends to have relation to a previous rainfall, some four or five weeks back, preceded and followed by a spell of dry weather.

It was supposed that this might have relation to the hypothetical growth in the soil.

The suggestion was made in former reports that, owing to the dry weather preceding the so called critical rainfall, the bacilli in the surface layers of the soil were largely killed off, and that, as a result of the rainfall, Typhoid bacilli, deposited in a number of places, were able to undergo growth laterally and upwards. As a result of the subsequent dry weather these superficial bacilli, it was supposed, may become detached and dispersed.

There are, however, considerable difficulties in the way of this hypothesis. It is difficult to see where the bacilli are to reach the surface in towns, in such a manner that they can get dispersed in large numbers, and how they are to be transported when they have reached the surface.

The most likely spot for this to happen is the ground, often, if not always, polluted, on which the pail closets rest, or the surface of middens with the ground surrounding them. But this is, by preference, the breeding ground of the housefly, and, apparently, no unusual place of resort.

It cannot be doubted that a polluted soil is favourable to the persistence of the Typhoid bacillus. Probably it is more likely to persist more successfully, and to find easier means of transference from these positions than from other parts of the soil.

If, however, with conservancy systems this is the most likely spot for the infection of Enteric Fever to lodge in, it is, so far as pail closets are concerned, one less likely to be directly affected by rainfall than almost any other on or near the surface of the ground, and that conservancy systems do, on the whole, favour the persistence of Enteric Fever may be regarded as proved. It may be, then, that the observations with regard to rainfall and Enteric Fever point only to an indirect relation between soil and infection, and that in reality they may indicate an influence on the movements of the transmitting agent.

If, again, we can point to any town in which the soil is not exposed, in which a conservancy system has ceased to be used, where the water supply is excellent, and in which no special causative agent appears to be at work, but in which Enteric Fever remains fairly high, and in which the usual autumnal curve is marked, we may conclude that though a polluted soil increases the sum of Enteric cases it is no necessary condition. Such an experience would go to enhance the influence of overlooked cases and of direct infection, while it would not exclude transmission by flies. It is difficult to be sure of all the facts for any town ; but Liverpool seems to be a case in point.

It is, perhaps, worth while to re-examine the data with regard to the relation between rainfall and the somewhat abrupt rises which are liable to occur in the average number of cases of Enteric Fever, with a view to see whether the influence of rainfall may be, not directly on the soil, but on the movements of the housefly, regarded as the transmitting agent.

Clearly this does not exclude a possible increase of the number of Typhoid germs on the surface of polluted soil. But, on the other hand, such an enquiry does not need this hypothesis, and transmission might be, not from soil in which the baccillus was persisting, but from recent deposits of infecting matters either inside the house or outside in the closets, and elsewhere.

Discussion of the Movements of the Housefly as a Possible Cause of the Rise in Autumn.

It may be that the essential relation is that an increased movement of houseflies takes place when there is decided rainfall preceded and followed by dry weather, whether into houses or closets.

The effect of such movements would, however, be greatly increased if there were a number of cases of Enteric Fever overlooked and regarded as Diarrhœa; and we have already seen that such oversights are liable to occur.

I have, therefore, examined the numbers of cases of Enteric beginning week by week, and the deaths from Diarrhœa occurring in the same weeks, and have placed them in relation with antecedent rainfall.

The first point which such an examination brings out is that the week in which a sharp rise of cases beginning to have Enteric occurs does not coincide with the rise of the Enteric curve. Usually there has been a lesser increase for some weeks preceding, which itself may have been introduced by a sharp rise in some one week.

On examining the relation of rainfall to Enteric attacks and to Diarrhœa deaths one is going on the supposition that dry weather will favour movements of flies out of doors, and from one house to another, while wet weather will drive them in. If, then, wet weather succeeds dry, infection should result, providing many flies have previously had access to infection. If dry weather succeeds wet the flies previously driven in will emigrate, carrying a fresh stock of infection which may only come fully into play when they are again drawn or driven inside.

It has already been seen, however, that the numbers of flies in a house may be greatly increased by other factors besides rain, and that, for example, baking day may cause a great increase in numbers. These causes are no doubt partial, while the effect of rain is general. They are, however, sufficiently large in amount to cause a great amount of migration, and go to diminish the differential effect of rain, as acting directly on the soil.

Then also the effect which transmission by flies can produce is dependent on the previous number of cases, and on the material to which they have had access, a factor which wlll vary greatly, and the effect which they can produce will depend, amongst other things, on the articles of food to which infected flies can gain access, and on the influences drawing or driving them into dwellings sufficiently soon after they have become infected.

With all these causes of variation it would not be well to expect too much from statistical evidence as to the action of flies.

In examining the following data it is to be remembered that if we were dealing with large numbers we might take any rise in the number of deaths from Diarrhœa as indicating a rise in number of cases about 10 days previously, and we might assume that infection had taken place some 2 or 3 days previously. With small numbers, however, such as those dealt with when the rise in Diarrhœal deaths is beginning, we must not use these intervals very rigorously.

If now we were to assume that flies had a powerful effect in causing the increase in deaths from Diarrhœa, and if, as is likely, an increased movement into and out of houses takes place when we get a marked rainfall preceded and followed by drought, we should look for such a rainfall within a fortnight, or about a fortnight, before the increase in the number of deaths from Diarrhœa, and from a fortnight to three weeks or over before the increase in the number of cases of Enteric Fever commencing to be ill.

To avoid repetition the weeks ending August 15, July 22nd, etc., will be written (Aug. 15) (July 22), etc.

The rainfalls given may in all cases be taken to have been preceded and followed by dry weather unless otherwise stated, and to be of fair or of considerable amount.

We find, then, that there was a slight rise in the number of Diarrhœa deaths in the week ending August 8. A slight rise in the number of Enteric cases began in the week ending August 15. A more marked rise occurred in the week ending August 29.

Rain preceded and followed by dry weather fell on July 19th to 22nd. Slight daily rain occurred from July 26th to August 2nd and 3rd, when the fall was fairly heavy.

If we take the latent period of Enteric Fever at from 14 to 21 days, or a little over, the rainfall on July 19th to 22nd may have been in relation to the rise in Diarrhœa deaths of the week ending August 8th, and to the slight increase in Enteric cases of the week ending August 15th, while the rainfall of August 2nd and 3rd may have had relation to the more marked rise of the week ending August 29th, which again may have been partly conditioned by the previous slighter rise.

In 1892 the Diarrhœa deaths begin to increase in the week ending August 6th, and there is a sharp rise in the week ending August 27.

The Enteric rise is marked in the week ending August 27th, and takes another step upwards in the week ending September 3rd.

There was heavy rainfall on August 7th and 8th, none on August 9th, 10th, 11th, rainfall on August 13th, 14th, 15th, and none to August 23rd, when there was a heavy rainfall.

It is possible that the rainfall of August 7th and 8th has relation to the Diarrhœa rise of (August 27th) and to the Enteric rise (August 27) while the rainfall of August 13th, 14th, 15th may also have had relation to the Enteric rise of (September 3rd) and to the Diarrhœa rise of (August 27th).

In 1893 there is no distinct Diarrhœal rise.

The Enteric curve undergoes a gradual increase, beginning (July 8th) and becoming more marked (August 20th). There was practically no rain till June 22nd, 23rd, 24th, and again on June 26th. Here the rise requiring explanation is the first one in (July 8th), and the rainfall, June 22nd, 23rd, 24th, does not appear to supply a sufficient explanation, as the period is somewhat short.

In 1894 the Diarrhœa curve rose in (July 14th), but remained low. The Enteric rise occurred (August 4th). There was rainfall on June 10th, again on June 15th, and again on June 17th to 20th. Then practically no rain fell till July 2nd. Rain fell on July 25th. These data do not accord with the causative action of rainfall with the doubtful exception of the fall on July 2nd.

In 1895 Diarrhœa increase (July 20th) was marked, but remained low. The Enteric rise (August 3rd) was marked, but slight.

Rain, July 11th, then little till July 16th.

In 1896 there was no marked Enteric rise. Diarrhœa rise July 18th. Rainfall July 8th and 9th.

In 1897 Diarrhœa rose by steps, which may be represented thus (July 24th), (2), (July 31st), (4), (August 7th) (8), (August 14th), (16). The number of deaths was doubled at each step.

Enteric slight increase (August 14th), marked (August 28th).

July 5th-9th, rain preceded and followed by drought.

July 20th, rain.

July 24th to 28th rain

Again August 5th and 6th.

In 1898 Diarrhœa rise (July 22nd).

Enteric ri-e slight (August 5th and 12th), marked (August 19th).

Rain, July 10th and 11th.

Again July 18th and 22nd.

No marked rain later which could affect the rise.

These observations have been given in as abridged a form as possible but, it may be hoped, clearly.

Taken as a whole they do seem to show some relation between antecedent rainfall, preceded and followed by drought, and the subsequent increase of Diarrhœa deaths, as well as of Enteric cases, the apparent relation for Enteric being less marked than for Diarrhœa.

As far as they go, they are consistent with the supposition that flies act as transmitters of infection, and that the observed relations between the rise in Diarrhœal deaths and the sharp increases in Enteric cases occurring in Autumn, may stand in relation with the movements of flies.

As already stated, however, this relation must be subsidiary to other factors, and must coincide with an increase in the amount of infection, arising, it may be, from an increase in overlooked cases—it may be from other causes.

It is notable that the year in which flies were scanty, viz., 1902, is not one of low prevalence of Enteric for either Harpurhey or Clayton, the districts of tips, although there is a coincidence in the amount of their incidence rates.

In what way can these deposits affect the districts? Reflection indicates that they may act by the enormous numbers of flies which will issue from them, rather than by any other means.

If, now, the persistence of Enteric in a district were due to its perpetuation by insanitary closets and ground, we should expect a smaller range of seasonal incidence (other things being equal), than if the persistent condition were deposits causing dissemination of large numbers of flies, or continuance of direct infection, and if both conditions were operative, we should expect the smaller range where the polluted ground about closets was most in evidence. We should thus expect the greatest range in Harpurhey, a smaller range in Clayton, and more steady persistence in Ancoats, Bradford, Newton and West Gorton.

Harpurhey and Clayton do show the greatest amount of range. Bradford and West Gorton, on the whole, the least. In these last districts we must look to the middens as probably being an important factor in causing persistence.

But every district shows a great variation of incidence from year to year, and the variations move often in opposite directions in adjoining districts.

The amount of infective material available, therefore, no doubt changes from year to year. Probably, this implies that personal infection has to do with the varying prevalence, and it necessarily implies that whatever the amount of persistence of infection, other factors are required to make it available for infection.

The Influence of the Subsoil.

I have already given reasons why we should put aside a general persistence of the Typhoid bacillus in the soil as determining the autumnal rise, while accepting it as probable that persistence in the ground about closets has to do

with it. With a view, however, to see whether more light can be thrown on the influence of the ground by a study of local conditions, I have brought together the number of attacks in the seven years 1897-1903, in each of the sanitary districts of the City. I have also given the mean annual attack rates for each sanitary district for the five years 1897-1901, based on the populations in the middle of 1899, and for each district for the years 1899-1903, based on the populations in the middle of 1901. These facts are checked by the application of the serum test, and by careful revision, though they are perhaps more reliable for the last five years than for the first two.

Enteric Fever Attacks.

	1897	1898	1899	1900	1901	1902	1903	Mean Attack Rate 1897-1901	Mean Attack Rate 1899-1903
Ancoats	40	53	42	30	40	32	32	0·90	0·92
Central	32	38	26	17	22	28	20	0·85	0·81
St. George's	46	96	43	42	26	47	50	0·83	0·78
Cheetham	32	44	20	23	17	12	19	0·76	0·49
Crumpsall	6	4	3	7	4	7	4	0·56	0·13
Blackley	11	9	5	10	2	2	3	0·86	0·50
Harpurhey	10	16	19	23	12	22	4	1·13	1·01
Moston	8	12	6	4	6	5	5	0·70	0·43
Newton	40	56	31	23	34	36	30	0·93	0·76
Bradford	20	37	18	21	29	23	22	1·08	0·95
Beswick	8	19	1	7	8	22	11	0·75	0·84
Clayton	3	9	5	10	17	13	4	1·26	1·18
Ardwick	32	45	33	25	17	31	44	0·75	0·72
Openshaw	55	45	20	35	29	15	20	1·38	0·87
West Gorton	41	42	19	24	36	24	38	1·12	0·96
Rusholme	9	11	11	7	12	4	16	0·47	0·39
Chorlton-upon-Medlock	42	33	37	26	20	22	20	0·54	0·43
Hulme	68	73	42	44	28	33	45	0·73	0·56
Total	503	552	381	378	359	378	387	0·81	0·69

From these figures we see that the districts having the highest attack rates from Enteric Fever were Harpurhey, Clayton, Bradford, West Gorton, Openshaw, Ancoats, Newton,

Influence of the Subsoil.

If we refer to the geological surface map for Manchester, published in the handbook prepared for the British Medical Association, we find that all these districts have a surface of drift clay.

The two districts having a large surface of river gravel, viz., Chorlton-upon-Medlock and Hulme have a comparatively low attack rate from Enteric Fever, although in the latter one would have expected the death rate to be fairly high, so far as it is influenced by overcrowding and insanitary conditions.

On the other hand several districts having a subsoil of drift clay, viz.—Rusholme in the South, Cheetham, Crumpsall, and Moston in the North, have a still lower attack rate.

It does not appear, therefore, that the pervious or impervious nature of the subsoil exercises very much influence.

The Autumnal Increase in Manchester.

It will be seen that the above considerations point to the Autumnal rise being, in Manchester, due to an intensification of processes acting, on the whole, less actively at other seasons, the chief of which is summed up in what I have called "direct infection." In Autumn this is aided by the higher temperature favouring the multiplication of Enteric bacilli, by the cloaking influence of Diarrhœa (and we have seen how powerful is the effect of overlooked cases in spreading the disease), by consequent transmission by flies probably, and by shellfish certainly, though possibly not largely. There appears in these causes to be enough to account for the extent to which the disease increases in Manchester in Autumn

MEASLES.

The following are the usual annual tables relating to Measles. It will be remembered that the Education Authority has hitherto furnished to the Medical Officer of Health a daily list of all cases of Measles coming to their knowledge. The homes of these cases are visited by the Sanitary Inspectors, who instruct the relatives in the precautions to be taken, and attend to any sanitary defects found. No schools or parts of schools were closed by the Sanitary Authority during 1904.

From both Measles and Whooping Cough in 1904 the death-rate was above the average of the preceding 5 years, being highest in the case of Measles in South Manchester, and in the case of Whooping Cough in the Manchester Township. The death-rate from Measles is higher than in any one of the previous four years.

The districts in which Measles exacted the highest death-rate were Harpurhey, Ardwick, Openshaw, and Hulme.

The number of schools having over 10 per cent. of the average attendance affected with Measles or Whooping Cough at some period of the year, distributed in districts, was as follows :—

	Total	Percentage Absent at one time				
		10 –	20 –	30 –	40 –	50 –
Ancoats	3	3	...	...	...	...
Central	5	3	2	...	...	...
St. George's	3	2	1	...	...	...
Cheetham	5	4	1	...	...	...
Crumpsall	1	1	...	...	...	...
Blackley	...	...	...	...	...	...
Harpurhey	2	1	1	...	...	...
Moston	2	1	1	...	...	...
Newton	11	9	1	...	1	...
Bradford	5	3	2	...	...	...
Beswick	2	2	...	...	...	...
Clayton	...	...	...	...	...	...
Ardwick	6	5	...	...	1	...
Openshaw	5	3	...	1	1	...
West Gorton	3	2	...	1	...	...
Rusholme	2	...	...	1	...	1
Chorlton-upon-Medlock	9	7	2	...	...	...
Hulme	5	5	...	...	...	...
Total	69	51	11	3	3	1*

* Over 70 per cent.

The following are the rates of mortality for 1904, compared with the mean of the previous five years :—

1904.—Measles Mortality.—Rate per 1000 living, compared with mean of five years.

	1899	1900	1901	1902	1903	Mean	1904
England and Wales	0·31	0·39	0·27	0·38	0·27	**0·32**	0·36
*76 Great Towns	0·46	0·43	0·43	0·49	0·36	**0·43**	0·47
London	0·47	0·42	0·43	0·51	0·45	**0·46**	0·49
City of Manchester	1·28	0·47	0·53	0·44	0·62	**0·47**	0·76
Manchester Township	2·35	0·37	0·58	0·44	0·96	**0·54**	0·86
North Manchester	1·22	0·53	0·29	0·67	0·34	**0·61**	0·50
South Manchester	0·71	0·48	0·68	0·29	0·64	**0·56**	0·89
*142 Smaller Towns	0·28	0·51	0·25	0·37	0·29	**0·34**	0·36
Rural Districts	0·21	0·32	0·17	0·27	0·17	**0·23**	0·23

*The rates for 1901 and previous years are for the 33 Great Towns and 67 Smaller Towns, and for 1902 and 1903 103 Smaller Towns.

The deaths from Measles in districts are as follows :—

1904—Deaths and Death-rates from Measles in the various divisions of the City.

Statistical Divisions	Estimated Population	Deaths	Death-rate
City of Manchester	**558,335**	**425**	**0·76**
I. Manchester Township ...	130,742	112	0·86
II. North Manchester.........	177,056	89	0·50
III. South Manchester.........	250,537	224	0·89
I. Ancoats	44,141	37	0·84
I. Central	27,787	21	0·76
I. St. George's	58,814	54	0·92
II. Cheetham	39,531	18	0·46
II. Crumpsall	9,139	1	0·11
II. Blackley....................	9,311	...	...
II. Harpurhey	18,825	22	1·17
II. Moston	15,389	3	0·19
II. Newton Heath	37,552	19	0·51
II. Bradford	24,553	15	0·61
II. Beswick	12,123	9	0·74
II. Clayton	10,633	2	0·19
III. Ardwick	43,192	48	1·11
III. Openshaw	28,146	31	1·10
III. Gorton (West)	30,738	25	0·81
III. Rusholme and Kirk.......	25,886	7	0·27
III. Chorlton-upon-Medlock..	57,093	41	0·72
III. Hulme	65,482	72	1·10

1904.—Measles.—Deaths in Quarters in the City and in Groups of Districts.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
City of Manchester	100	189	83	53
Manchester Township ...	9	36	45	22
North Manchester	20	42	12	15
South Manchester	71	111	26	16

The annual death-rates from Measles since 1891 at ages under 5 have been as follows :—

DEATH-RATES FROM MEASLES AND FROM ALL CAUSES UNDER 5 YEARS OF AGE.

	1891	1892	1893	1894	1895	1896	1897
Measles	3·26	5·50	4·40	3·24	7·53	8·48	9·35
All causes	86·6	78·7	86·3	66·5	90·7	80·4	85·3

	1898	1899	1900	1901	1902	1903	1904
Measles	4·02	10·31	3·66	4·29	3·51	5·13	6·24
All causes	78·1	87·5	78·3	74·5	64·7	69·5	75·75

Recent history

It will be seen that a severe outburst began in 1895, and lasted for five years.

Comparison of mortality with that from other infectious diseases

A comparison of the mortality due to Measles with that caused by other zymotic diseases, and with Phthisis, is given in the following figures :—

No. of Deaths from	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904
Measles	220	369	293	222	505	567	628	271	699	254	292	242	345	425
Scarlet Fever	114	130	140	116	173	198	124	65	46	105	127	146	97	85
Diphtheria	122	91	122	102	72	54	29	41	71	76	133	123	136	99
Enteric Fever	189	124	127	91	95	118	95	120	73	75	75	66	93	66
Smallpox	0	2	49	21	2	0	0	0	0	0	0	0	24	9
Whooping Cough ...	518	368	240	286	250	359	299	170	227	371	224	242	213	280
Diarrhœa, &c.	432	418	956	375	904	572	964	1090	1121	822	1019	296	507	761
Phthisis	1117	1053	1060	1026	1139	1078	1139	1056	1117	1135	1144	1145	1025	1106

We thus see how greatly the mortality from Measles exceeds that from Scarlet Fever, Diphtheria, or Enteric Fever.

In 1897 and 1899 the deaths from Measles exceeded in number those from all these fevers, with Whooping Cough added.

WHOOPING COUGH.

The tables relating to this disease show the death-rate in Manchester for 1904 and for the preceding five years; in 1904 it exceeded the death-rate for England and Wales by 0·16 per 1,000 living.

The rates giving the Whooping Cough mortality for 1904 are as follows:—

1904.—Whooping Cough Mortality.—Rate per 1000 living, compared with mean of five years.

	1899	1900	1901	1902	1903	Mean	1904
England and Wales	0·30	0·34	0·30	0·29	0·27	**0·30**	0·34
*76 Great Towns	0·38	0·45	0·36	0·37	0·33	**0·38**	0·40
London	0·38	0·43	0·35	0·40	0·35	**0·38**	0·33
City of Manchester...	0·42	0·68	0·41	0·44	0·38	**0·47**	0·50
Manchester Township ...	0·41	0·79	0·41	0·55	0·25	**0·48**	0·70
North Manchester	0·50	0·66	0·48	0·42	0·24	**0·46**	0·47
South Manchester.........	0·37	0·64	0·36	0·39	0·55	**0·46**	0·42
*142 Smaller Towns......	0·32	0·34	0·30	0·22	0·28	**0·29**	0·35
Rural Districts	0·25	0·27	0·25	0·22	0·22	**0·24**	0·27

* The rates for 1901 and previous years are for the 33 Great Towns and 67 Smaller Towns, and for 1902 and 1903 103 Smaller Towns.

The following are the deaths in quarters, showing that the disease was most prevalent in the first half of the year:—

1904.—Whooping Cough.—Deaths in Quarters in the City, and in Groups and Districts.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
City of Manchester	70	122	49	39
Manchester Township ...	21	50	14	7
North Manchester	28	33	13	9
South Manchester	21	39	22	23

The following table shows the districts most affected. It will be seen that the districts most affected were the Manchester Township and portions of North Manchester.

1904.—Deaths and Death-rates from Whooping Cough in the various divisions of the City.

Statistical Divisions	Estimated Population	Deaths	Death-rates
City of Manchester	**558,335**	**280**	**0·50**
I. Manchester Township	130,742	92	0·70
II. North Manchester	177,056	83	0·47
III. South Manchester	250,537	105	0·42
I. Ancoats	44,141	34	0·77
I. Central	27,787	18	0·65
I. St. George's	58,814	40	0·68
II. Cheetham	39,531	7	0·18
II. Crumpsall	9,139	10	1·09
II. Blackley	9,311	1	0·11
II. Harpurhey	18,825	8	0·42
II. Moston	15,389	5	0·32
II. Newton Heath	37,552	29	0·77
II. Bradford	24,553	15	0·61
II. Beswick	12,123	5	0·41
II. Clayton	10,633	3	0·28
III. Ardwick	43,192	22	0·51
III. Openshaw	28,146	16	0·57
III. Gorton (West)	30,738	12	0·39
III. Rusholme and Kirk.	25,886	12	0·46
III. Chorlton-upon-Medlock	57,093	18	0·32
III. Hulme	65,482	25	0·38

SUMMER DIARRHŒA.

The great fatality of this illness amongst infants gives it a paramount claim on our attention.

Amongst those attacked, children under one year of age die in the highest proportion, and the mortality declines rapidly after the second year of life.

The following figures show the distribution of deaths from Diarrhœa according to age :—

Year	Under 3 months	3–5 months	6–11 months	1 year	2 years	3 years	4 years	Total under 5 years	Total above 5 years
1899	195	279	366	166	31	11	4	1,052	69
1900	132	223	271	124	9	1	5	765	57
1901	161	245	340	175	22	8	2	953	63
1902	55	84	96	32	8	1	3	279	17
1903	104	130	155	78	9	3	1	480	27

The distribution of deaths according to age follows, it will be noted, a regular course, the culmination being between the ages of 3 and 6 months.

That is not owing to any insusceptibility of infants at an earlier age, but is due to the much larger extent to which children are being fed at the breast during the first three months of life.

The great majority of the deaths occur during the first year of life.

The total magnitude of the loss from Epidemic Diarrhœa may best be realised by placing side by side the total deaths from Diarrhœa and those due to Phthisis :—

Deaths due to	1897	1898	1899	1900	1901	1902	1903	1904
Phthisis	1,139	1,056	1,117	1,135	1,144	1,145	1,025	1,106
Diarrhœa	964	1,090	1,121	822	1,016	296	507	761

It will be seen that in 1898 and 1899 the total number of deaths from Diarrhœa exceeded the total number from Phthisis.

It is true the losses to the community represented by these two sets of figures are not comparable. But neither from one nor the other cause does the loss end with the number of deaths, and it is possible that in the indirect loss Diarrhœa surpasses Phthisis. For every death from Diarrhœa there are a number of recoveries, but the effects on the constitution of the children who recover are often serious and of long duration.

In a comparison with other towns as regards mortality from Summer Diarrhœa, Manchester comes out badly. Along with a few other towns it takes a very low position, as shown by the following figures :—

Towns having a Comparatively Low Diarrhœal Mortality.

	London	Oldham	Halifax	Bradford	Blackburn	Leeds	Huddersfield	Edinburgh	Glasgow	Dublin
Average 1894-1903 ...	0·76	0·71	0·33	0·76	1·09	1·02	0·48	0·61	0·94	0·88
1904	1·04	0·91	0·34	0·83	0·81	0·99	0·51	0·42	0·89	0·89

Towns having a High Diarrhœal Mortality.

	Birmingham	Liverpool	Bolton	Salford	Burnley	Preston	Sheffield	Hull	St. Helens	Stockport	Manchester
Average 1894-1903	1·25	1·44	1·26	1·51	1·31	1·77	1·42	1·45	1·29	1·32	1·42
1904	1·76	2·52	0·94	1·66	2·01	1·43	1·35	2·08	1·61	1·70	1·36

What is Summer Diarrhœa? Does the term connote a disease, or a collocation of diseases whose chief characteristic is Diarrhœa. I believe with Ballard that Summer Diarrhœa is, in the main, a definite disease, due to a definite species or group of species of micro-organisms In his classical descriptions of the affection, he established its main features so clearly as to give it a clinical entity. It has not yet attained the position of a bacteriological entity in the general estimation. It is true Professor Delépine has made out a claim for a bacillus allied to, if not identical with, that of Gaertner as the *causa causans* not only of Summer Diarrhœa but also of other forms of food poisoning. As his conclusions are based on the accumulated work of years they are entitled to great weight.

They have been obtained by inoculation into animals of materials obtained from milk which have proved rapidly fatal to guinea pigs From the tissues of these have been obtained a bacillus identical with that found in the milk which caused the Victoria Park outbreak of 1894. These bacilli grown in pure culture have proved to have very virulent properties. They produce no material in milk offensive to taste or smell, so that no warning is given of their presence. Their number is dependent on the temperature to which the milk has been exposed, and on the length of time elapsing between milking and consumption or sterilisation of the milk. From these premises, and from

a study of the milk sent into Manchester, Professor Delépine concludes that the chief influence in the production of Summer Diarrhœa is the condition of the imported milk.

Dr. Newsholme and others, while giving their full value to the bacteriological conclusions to which Professor Delépine has come, consider that infection arises in greater measure after the arrival of the milk in town.

The question is an important one so far as the prevention of the disease is concerned, since on a right judgment as to the modes of transmission must depend our perception of the points at which we can break the chain of causation. I have, therefore, made a study of a number of cases with a view to see whether more light can be thrown on some of the essential causative factors. Nearly all the cases utilised have been investigated by Inspector Hewitt, and the value of the enquiry is due largely to the energy and care which he has put into the work. Before analysing the details which he has collected, it is desirable that one should consider what may be gained from the general facts presented in various ways.

The facts will be assumed to relate to one disease. This assumption is, strictly speaking, incorrect. Some of the deaths are, no doubt, due to Enteric Fever, and in a larger number, in all probability, Tubercular Enteritis has simulated or been the main cause of Epidemic Diarrhœa. Of those which present a typical picture it is possible that there are various bacteriological causes. In some a fatal issue may arise from the chemical products of bacteria contained in food which has itself been sterilised. There may also be a variety of allied, yet different, bacilli of the "Coli" type, as there are a variety of poisonous toadstools.

If we consider how many drugs can produce Diarrhœa, it seems likely that the products of a variety of bacteria will have the same power.

Nevertheless, having regard to the general uniformity in character of the illnesses, it is very likely that the great bulk of the deaths are due to one and the same cause, and that the variations of the death statistics, *provided the figures are fairly large*, represent variations in a specific disease.

It is a well-worn observation that Epidemic Diarrhœa is not a disease confined to the warm months. Yet it is essential to keep this fact in mind. The fatality of the disease in weeks is shown later on (page 204).

In examining the Inspector's papers at different periods, I have seemed to find that the proportion of deaths, which cannot certainly be assigned to Epidemic Diarrhœa, is highest when the numbers are smallest. Yet there is in Manchester, at all times, a substantial number of deaths, and therefore a still higher number of cases.

Supposing this disease to be communicable from person to person there are, therefore, foci present in many parts of the City.

The manner in which the deaths shoot up in Autumn, as shown by curves in the Annual Reports for 1895, 1899, and 1900, is very striking.

It recalls very forcibly the curve of an outbreak of Influenza, and strongly suggests the behaviour of an infectious disease with rapidly increasing foci of infection and a rapid diminution, which may partly be owing to exhaustion of available material and partly to lessened transmission.

This I pointed out in my Annual Report for 1903, and it deserves to be emphasised, because, as will be seen, a more careful inquiry into individual cases brings out an extent of direct infection, or at least of presumable direct infection, altogether beyond what one had expected.

It is sufficient to give the figures of deaths week by week for one or two years, and it is desirable to do so, because in this instance the figures are more striking even than the curves. These figures are obtainable from the Annual Reports for the last six years.

It will be observed that this series is not a true reflection of the course of the outbreak of Diarrhœa. The duration of Diarrhœa is very variable. It is probable that the increase in cases nearly coincides with the increase of deaths in point of time. But it is certain that the increase of cases is much more marked at the outset than the increase of deaths. At the very outset, in fact, the increase in deaths is due chiefly to cases in which the duration of illness has been brief.

I have therefore, later on, arranged the cases for 1904 at this particular part of the curve according to the dates of onset. (See page 208.)

The autumnal rise in the number of deaths is usually sharp in one particular week, and corresponds to the rise of the mean daily temperature in the week preceding the rise up to or about 60° Fahr.

There is no doubt that the temperature of the atmosphere is in close relation with the increase of Summer Diarrhœa.

The influence of rainfall is, in the main, I believe, a secondary one.

The rainfall may be high, and yet the Summer Diarrhœa death-rate be high; or it may be low, and the Summer Diarrhœa rate may be low.

Thus, in the third quarters of 1893 and 1895 the rainfall was high, yet the Diarrhœa death-rate was also high. In the third quarter of 1902 the rainfall was unprecedently low, and so also was the Diarrhœa death-rate.

On the other hand, the mean temperature of the quarter was high in 1893 and 1895, and in 1902 it was low.

A high rainfall tends to lower the temperature, but where it fails of this effect Diarrhœa is in excess. On the other hand, in spite of a low rainfall, the atmospheric temperature may be low, and then there is no excess of Diarrhœa.

In no year, however, is the death-rate from Diarrhœa in excess of the mean without a corresponding excess in the mean temperature of the atmosphere.

The relation of Diarrhœa to the mean daily temperature of the preceding week is further shown in detail as follows :—

	Deaths begin to increase in the week ending	Rise of mean daily temperature to or over 60° F. in the week ending
1892...	August 6th	Temperature exceeded 60° F. on July 24th and 25th
1893...	June 17th	Exceeded 60° F. on June 5th and June 6th
1894...	Slight increase week ending July 7th Again in week ending July 14th There was little diarrhœa in this year	Mean temperature in week ending June 30th went up to 63° F. In week ending July 7th to 65·1° F.
1895...	July 20th...........................	July 13th—60·2° F.
1896...	June 6th—7 deaths .... ,, 13th—8 ,, ... ,, 20th—10 ,, ... ,, 27th—16 ,, ... July 4th—18 ,, ... ,, 11th—9 ,, ... ,, 18th—40 ,, ... The slow rise in June should be noted, and the more rapid increase after a second rise of temperature	June 6th—61° F. ,, 13th—62·2° ,, 20th—65·2° ,, 27th—59·3° July 4th—57·9° ,, 11th—63·3° ,, 18th—61°
1897...	July 24th...........................	July 17th—63·7° F.
1898...	July 30th...........................	July 16th—60·2° July 23rd—61·2°
1899...	June 10th—4 deaths .... ,, 17th—9 ,, ... ,, 24th—4 ,, ... July 1st—8 ,, ... ,, 8th—5 ,, ... ,, 15th—9 ,, ... ,, 22nd—22 ,, ...	June 10th—61·5° F. ,, 17th—61·8° ,, 24th—60·6° July 1st—60·7° ,, 8th—61·1° ,, 15th—60·7°
1900...	July 21st	July 14th—64·9° F.
1901...	July 13th...........................	July 6th—62·5° F.
1902...	Week ending August 30th, and continued to rise slightly	Temperature nearly reached 60° F. in this and the following week
1903...	Slight, week ending July 4th...... Marked, week ending July 18th...	June 27th—60° F, sharp rise. July 4th—61·8° July 11th—59·8°

We see, then, that a marked rise of the atmospheric mean daily temperature over 60° F. is generally followed by an increase in the number of deaths in the week following.

If we remember that the most common period between the commencement of illness and death is over a week, but that many deaths occur at a shorter interval, this must mean that the rise in the atmospheric temperature reacts almost immediately on the number of attacks.

Either, therefore, heat is of itself a powerful cause of Diarrhœa, or the infective matter grows with excessive rapidity at this temperature, or in some way this high temperature favours the propagation of infection.

That the depression of the system arising from heat is not one of the most powerful determining factors appears to be shown by the comparatively small incidence of fatal Diarrhœa on many towns in the South of England, and from other circumstances. That it has some effect is probably true.

It cannot be supposed either that any sudden increase of growth of infective material is produced in milk or other food by the slight change of temperature at 60° Fahr. This appears to be shown in Professor Delépine's paper on Summer Diarrhœa, published in the "Journal of Hygiene," Vol. III.

There must, then, be some other cause brought into active operation about this temperature.

It is permissible, meantime, to surmise that this cause is the rapid development of flies, which serve to transmit infection from one house to another.

In a discussion as to whether milk is contaminated in the country or in the town, it would no doubt be pointed out that house flies are often abundant at farms, and might convey infection to the milk at the farm as well as in the town. As a matter of fact, however, Diarrhœa is generally much less prevalent in the country than in the town, and there is this difference, that there is often in the country an absence of the infective matter to transmit. In the town specific infective material is much more abundant.

Even when the infective material is present in the country, the house-fly would usually not take the journey necessary for its transmission from one farm to another.

There is no proof that this affection or any allied affection is common in cattle in the season preceding Summer Diarrhœa.

It is possible that the occurrence of Diarrhœa in some person living at the farm is usually a necessary precedent condition of its transmission in milk from the farm.

It will be seen that the occurrence of a high temperature is not always accompanied by a rise in the diarrhœal death-rate, especially when it happens early in the season.

This, again, suggests that something besides a high temperature is necessary for the propagation of the disease, and this something may be abundance of the house-fly, which tends towards fixity of its seasonal period.

Further, it will be noted that the upward course of the weekly curve of deaths is not completely arrested by failure of the temperature to reach 60° F., which again points in the same direction.

As already mentioned, in all cases, however steep its ascent, the number of deaths increases for a time, week by week, pointing to the gradual multiplication of foci of infection.

It may be said that such points of infection may multiply at the farms. In that case we should expect at first massive infection in particular milk supplies. It is practically certain, however, that this does not occur, and that the increase has no reference to particular milk supplies.

The picture presented by the deaths very strongly suggests, in fact, a rapidly spreading infection carried in some manner from person to person.

There are other directions in which the question might be attacked.

As Dr. Newsholme points out, we have to account for the proportion, sometimes not inconsiderable, of breast-fed infants who are attacked and die, and for the very high proportion of fatal cases who have been fed on condensed milk.

As to the latter, his argument is not a conclusive one, as condensed milk is not sterilised in the process of manufacture, and may contain bacilli of the Coli type.

Nevertheless, the facts as to the particular food supplied, when taken together, tend to restrict the extent to which infection at the farm can be held to be the cause of the disease.

It might be supposed that a study of the behaviour of the disease in the different sanitary districts into which Manchester is divided would throw some light on these questions, and I have therefore brought together the number of deaths from Diarrhœa in infants under 1 year of age in these districts.

It cannot be said that these particulars determine whether infection is introduced from without or whether it is contracted in the district.

They do, however, convey some impressions.

Not merely on the average of 10 years, but for individual years they show that, as with Phthisis, the fatality is much higher in the Manchester Township than in South Manchester, and that it is higher in South Manchester than in the Northern Districts.

There is not, however, anything like the degree of difference that there is in respect of Phthisis. Still, the suggestion is the same that the circumstances of the people determine to no slight extent the infantile death-rate.

There are, however, marked exceptions to this general statement.

The districts of Bradford and Clayton in North Manchester, and in South Manchester the district of West Gorton, are distinguished by remarkably high diarrhœal death-rates.

This is due, not altogether or mainly, to poverty, but partly to unsuitable cleansing arrangements, and also to ignorance of the methods of managing infants.

Along with other facts, they point to the need of a house to house inspection, especially in Bradford and West Gorton, and to the necessity for an extension of the instruction in infant feeding which is now given by the visitors of the Ladies' Public Health Society.

The fluctuations are much greater in some districts than in others.

They are particularly conspicuous in Crumpsall, Blackley, Harpurhey, Moston, Clayton, and Chorlton-upon-Medlock.

Partly these fluctuations are due to the smallness of the population. But this is not the case with Harpurhey and Chorlton-upon-Medlock.

It is not easy to see precisely what these great fluctuations mean. They might conceivably be due to milk supplies variably contaminated. But they might also be due to the character of the population, the families being such that a considerable intensity of infection is required to produce a high death-rate, and they may, also, be due to variation in the number of flies.

There can be no doubt that, if we subdivide the districts into small divisions, we shall find, in most years, certain localities highly infected in that year alone.

In the bulk of the districts, however, their relative position is maintained year by year, a fact which points to the presence of endemic foci of infection.

Deaths under 1 Year from Epidemic Diarrhœa per 1000 Births.

	1899	1900	1901	1902	1903	Average of 5 years ending 1903
City of Manchester	**63.7**	**35.6**	**47·5**	**13·0**	**22·1**	**32·5**
I. Manchester Township..	78·5	47·5	61·6	16·6	31·3	39·8
II. Northern Districts	57·4	24·4	42·3	10·7	15·0	26·8
III. Southern Districts	58·7	36·1	43·2	12·4	22·0	31·5
I. Ancoats	85·0	48·6	57·4	17·1	30·2	40·7
I. Central....................	71·1	55·0	66·1	15·0	48·5	46·7
I. St. George's	76·7	43·4	63·3	16·9	25·5	36·0
II. Cheetham	36·0	18·0	27·3	9·4	10·1	19·2
II. Crumpsall	60·9	14·6	23·2	14·9	9·8	19·6
II. Blackley	44·2	4·4	9·2	4·0	12·1	9.4
II. Harpurhey	72·6	11·3	36·5	1·8	15·9	27·4
II. Moston	29·1	2·8	19·0	11·7	8·8	15·4
II. Newton Heath............	57·9	25·4	49·7	12·3	15·6	26·6
II. Bradford	93·3	43·3	62·7	13·2	26·9	41·1
II. Beswick	46·4	40·6	50·0	20·6	8·4	29·5
II. Clayton	66·7	36·4	94·9	6·2	20·2	43·8
III. Ardwick	61·7	43·7	48·4	11·5	20·0	30·3
III. Openshaw	64·3	44·7	48·1	14·2	27·4	36·2
III. West Gorton	85·7	52·6	58·4	21·2	31·1	43·4
III. Rusholme and Kirk ...	34·0	15·4	33·1	11·6	14·0	23·0
III. Chorlton-upon-Medlock.	58·7	25·1	27·9	7·1	23·9	24·5
III. Hulme	49·5	33·1	43·6	12·0	18·7	31·9

With these preliminary remarks I will now go on to consider the cases investigated, for the most part, by Inspector Hewitt, acting under my direction. I have made an analysis of the facts collected. But some particulars do not admit of analysis. Thus, in most instances, the methods pursued in feeding the infants are set out at great length, and these observations do not lend themselves readily to compression. The cases number 111. They have been taken without any principle of selection, except that they shall lie principally in Hulme and St. George's, two centrally situated districts.

First as to the modes of feeding.

Dr. Hope has calculated that the chance of a breast-fed infant contracting fatal Summer Diarrhœa is to that of a hand-fed infant contracting the disease as 1 to 15. Dr. Holt, quoted by Dr. Ashby in his work on "Diseases of

Children," makes the proportion three per cent. In this investigation we find that only four of the infants investigated under twelve months of age at death were breast-fed entirely or chiefly.

This gives a percentage of breast-fed children = 4·5 per cent.

Upon this enquiry I have come to the provisional conclusion that, in the lowest stratum of the population, when women do not feed their children at the breast, in the great majority of instances, it is because they cannot, and not because they do not wish to do so. Even when it is otherwise, they may cease suckling because they are misled rather than from any wish to abandon the personal care of their infants.

In order to ascertain the facts, I have divided the 111 children into those under twelve months of age, and those at age twelve months and upwards.

The former number 88, the latter 23.

Of the 88, four were breast-fed only; of the 23, 9 had been fed at the breast up to nine months or over, while 14 had been weaned before this age. This shows that the child to a large extent loses the protection afforded by breast-feeding when exposed to bad methods of feeding afterwards.

I have made a brief *résumé* of the causes why 84 out of the 88 children were weaned (with three exceptions entirely) at an early age. It is difficult to condense this into very small compass.

The picture is one of poor women, not rarely half-starved, trying to do their utmost to protect their infants, while usually themselves in a wretched state of health.

The reasons why the 84 infants were weaned may, however, be imperfectly rendered as follows :—

In 5 instances the mother died.

In 17 instances the milk stopped on the mother getting out of bed, or at an early period, corresponding with previous experiences, the mother usually being in feeble health.

In 11 instances the infants were weaned on account of affections of the breasts, of which 10 were abscesses.

In 18 instances the mother ceased to suckle her child because the milk was poor, or insufficient, or because it appeared to disagree with the infant.

In 16 instances definite illness in the mother arrested or prevented breast-feeding.

In 4 instances the milk was stopped through serious trouble.

In 4 instances the mother had to go to work.

In 2, pregnancy was the cause of arrest.

In 2, the infant refused the breast.

In 1, the infant was illegitimate.

In 4, no definite cause was assigned.

It will be seen how small a part, in Manchester, in the districts concerned, the need for returning to work played in the loss of these infants from Diarrhœa.

Intemperance, in the man usually, but not infrequently in both, has a decided share in the result, but it is a difficult one to assess.

I have long had a conviction founded on previous inquiry that the anxiety of mothers to return to work was credited with too high a share in the infantile death-rate. But what has not been so evident is the anxiety of even the poorest mothers, as a rule, to do all in their power in the way of feeding their infants at the breast.

What was the condition of the 111 children before the attack.

In 31 instances the child is stated to have been "in good health," in 75 the health antecedent to the attack was poor.

In 5 instances (18), (23), (79), (83), and (100), the cases cannot be put in either class, being in (18) and (23) too young to allow of a judgment being formed, while in (79) and (83) the health was not quite good, and in (100) information was not available.

Although the number of infants "in good health" when attacked is less than one half of those in poor health, it is sufficiently large to show that fatal Summer Diarrhœa can attack healthy infants.

It is necessary to submit this conclusion to a rigorous scrutiny, and to make all proper deductions.

When the cases are carefully gone over, we find that in a certain number of the 31 there is reason to doubt the statement that the infant was "in good health" when attacked.

(35) Infant discharged saliva profusely.

(45) Infant 14 months of age at death; was ill at the age of six months, and was always thin.

(51) Nine months old at death; was ill when four months old; health not altogether good.

(52) Six months old at death; apparently under-fed; said to have been neglected.

(54) Mother believed to be an alcoholic

(66) A squalid home.

(74) Child admittedly neglected.

(85) Previous health doubtful.

(86) Probably not in good health.

(90) Five children previously lost in infancy.

If these 10 cases are subtracted, the number left as having previously had good health is 21.

Of the 21, we find that 10 had been exposed to direct infection, and one to indirect. There remain 10 cases previously in good health and without a history of infection. Of these, two were being fed at the breast at the time of attack. Certainly in the majority of these 10 no explanation is found, either in exposure to direct infection or in the previous state of health of the child attacked.

It is to be remembered, at the same time, that the tendency is to represent the infant as having been well, which means also well cared for, at the time of attack. In any case previous bad health is a powerful influence in determining a fatal attack.

It is very difficult to classify the conditions from which the ailing infant was suffering prior to the onset of the final attack of Diarrhœa.

Frequently a number of conditions are present, and it is almost impossible to select the most important.

We may, however, represent them roughly thus :—

Infant failed to thrive	14
Suffered from frog, thrush, or ulceration of the mouth	4
Previous Diarrhœa, suspected to be associated with Tuberculosis in 8, with insufficient food in 3	17
Indigestion	11
Enteric Fever	2
Previous illness suspected to be Tubercular	12
Cough, weak chest, Bronchitis	6
Attack followed Measles, German Measles, Whooping Cough	5
Child believed to be starved	4
	75

We have seen that, owing to the extent to which they are interdependent, it is impossible to give an adequate picture of all the conditions antecedent to the attack. Take for example :—

Innutrition.—We find from the analysis that no fewer than 23 out of the 111 children were practically starved, but that there was reason to believe that as many as 56 were being insufficiently nourished.

It is very clear that the previous condition of the infant is one of the chief determining factors of fatal Diarrhæa.

In arriving at the above figures, one has taken into account the very full description given of the modes of feeding and the actual condition of the infant.

Two instances will suffice to show the nature of the data.

Case 1.—This child was fed from birth to five months on Nestle's sweetened condensed milk and barley water.

Two dessert-spoonfuls of barley water and one of milk were sweetened with sugar; the feeding bottle was one quarter filled. The infant was fed twice per day.

From the fifth to the sixth month barley water alone was given. This infant never put on flesh. The mother had died after confinement.

Case 2.—In this case she was two years old at death. Her food consisted of tea, crusts dipped in gravy, and anything from the table. She is stated to have been fed in this manner from the fifth month of life. Yet her health was stated to have been good up to the age of 10 months. Presumably it has not since been so good, and from August 5th to September 10th (on which date the attack of Diarrhœa commenced) the child suffered from ulcerated mouth.

The feebleness and gastric irritation produced by such feeding must greatly swell the number of attacks, since it is likely that a comparatively small amount of infection will in these cases set up the disease.

The starvation of the child is, in almost every instance, unintentional, of course.

Sometimes, in default of means, it is gross. Sometimes it arises from the use of condensed milks. Sometimes it is the result of ignorant feeding, which keeps the infant in a state of intense irritation, so that food will not remain on the stomach. In other cases it is the consequence of ill-health, whether congenital or acquired.

In the great majority of cases, however, it is entirely avoidable, and, with more knowledge on the part of the mother, probably would be avoided.

Influence of Intemperance in the Parents.

There is one factor which very much influences the care bestowed by the parents, viz.: the habits as regards alcoholic excess of one or both of the parents. It stands in no necessary relation with the health of an infant, but it must have a much greater influence in the house of a poor than in that of a rich man.

In the bulk of the cases in which this fact was enquired into, both parents were temperate, so far as could be ascertained.

In 12 instances the father alone was decidedly intemperate, and in two of these the child was healthy prior to the attack.

In one instance the mother alone was intemperate, and in this case no information could be obtained. In another the child was unhealthy, being under the care of a drunken nurse.

In six instances both parents were ascertained to be intemperate, and in one of these the child was healthy prior to attack. In another instance, however the child was healthy prior to severe illness of the drunken mother.

Thus, out of 20 instances in which one or both parents were ascertained to be intemperate, the infant was in a good state of health in four, a ratio more unfavourable it is true than holds for all the cases, but less so than one would have expected.

It can hardly be doubted, however, that intemperance exercises a marked influence.

Condition of health of other members of the family—Tuberculosis and Enteric Fever.

We have seen that in a considerable number of instances there was reason, in the previous condition of the infant's health, for suspecting that the acute attack of Diarrhœa had supervened on a more chronic tubercular affection.

It is of interest to ascertain whether there is anything in the state of health of other members of the family to support this suspicion. It is true Tuberculosis of the bowel might be due to the consumption of tuberculous milk, but it might also be due to contamination from infectious matter derived from another member of the household. The number of infants suspected to be suffering from Tuberculosis was 20.

The number of families in which there was some person affected with Phthisis or Chronic Bronchitis, or some form of Tuberculosis, was 32; signs suspicious of Tuberculosis were observed in 1, and in 3 there was a history of previous occurrences of Tuberculosis. In 4 instances, again, there was reason to believe that the illness may have been Enteric Fever.

Of the 20 infants mentioned above, 15 occurred in the 32 households having inmates suffering from Tuberculosis.

It would seem from these data that Tuberculosis pl ys no small part in the causation of Summer Diarrhœa, while there is a substantial danger of Enteric Fever being cloaked by Diarrhœa.

Before going on to consider the facts relating to food, we may first touch on two questions which bear closely on the exposure of these 111 infants.

Previous history of the family as regards Summer Diarrhœa.

The first of these is the previous history of the family as regards previous deaths from Diarrhœa.

Of the 111 families, we find that in no fewer than 90 there had been no previous deaths from Diarrhœa. The total number of children living in these 90 families at ages 12 and under was 188.

Inasmuch as the conditions were highly unfavourable in many of these 90 families, an *a priori* presumption is created that some special condition is necessary to cause fatal Summer Diarrhœa, even under unfavourable conditions. We shall see reason to believe that this condition is the introduction of the specific infection. But meantime it is sufficient to note the facts.

It almost necessarily follows that, where not one but two or more previous deaths from Diarrhœa have occurred, there is probably some factor additional to dirt or ordinary negligence.

Now, the number of families in which only one previous death has occurred is 13, in one of which, however, the previous death is believed to have been due to Tabes Mesenterica.

Neglecting these, in the meantime, we get 8 families to account for in which two or more previous deaths had occurred.

Of these	(18)	with 5	deaths	as against	4	living.
,,	(31)	,, 3	,,	,,	3	,,
,,	(46)	,, 10	,,	,,	1	,,
,,	(95)	,, 9	,,	,,	2	,,

stand out conspicuous.

Against (18) we have these notes: House dirty; very dirty household; mother drinks, and has heart affection.

(31) Food insufficient.
Mother probably phthisical.
Gums often rubbed with fingers.
Tea given to infant.
Father out of work.

(46) Family highly tuberculous.

(95) The previous 9 deaths are ascribed to Tabes Mesenterica.

It is probable that special causes, especially Tuberculosis, are usually operative in the most aggravated instances.

In no fewer than 12 out of the 21 instances of recurrence, there is reason to believe that Tuberculosis has invaded the household.

We have already seen, however, that where the conditions are especially unfavourable, as in case (18), the presence of other disease is not necessary to account for the fatal sequence of cases.

Take, then, the 9 cases without a definite tuberculous history—

Case 7.—One previous death. This infant had a weak chest after the age of three months.

The milk often went sour.

It was used unboiled.

When 12 months old this infant was fed on potatoes, gravy, fat meat, etc.

The house is clean.

This child was probably infected by her sister.

Here also there is a suspicion that the child may have been tuberculous, the more so that the father suffers from a chronic cough.

Case 9.—This child is suspected to have been tuberculous, as, previous to the fatal attack of Diarrhœa, he had suffered from Diarrhœa for five months.

A sister had an operation performed two years ago for abscess behind the ear.

The mother has a weak chest

Case 18 already mentioned.

Case 32.—A cellar dwelling.

There is a heap of refuse in front of the door.

The dwelling is damp.

Even here a possibility of Tuberculosis presents itself.

A brother has slept in the same bed with this infant, who has suffered from Diarrhœa for four months.

Case 44.—No remarks.

Case 69.—No remarks.

Case 80.—Child lost the advantage of the mother's care through her illness. No special history. Filthy back passage.

Case 85.—Filthy narrow passage. Smells, at the emptying of the pail closets, fill the house.

The sieve for the barley water is dirty. The mother is no doubt neglectful.

Case 100.—Probably part of an Enteric series. Mother died of Enteric Fever. The home was squalid before her illness.

We may summarise the particulars relating to the constitution of families in which no previous cases of fatal Diarrhœa had occurred, thus :—

Number of children living under 12 years of age.

	0	1	2	3	4	5	6	7	Total
No. of Families.	20	17	16	17	15	3	1	1	90

The 90 families, therefore, contained 188 children living, at ages under 12.

The number of families in which one previous death had occurred was 13.

The numbers living in these 13 families at ages 12 and under were: in five 1, in four 2, in two 3, in one 4, and in one 7.

The families in which two previous deaths had occurred numbered 4.

In two of these 2, and in two 3 children were living.

Three previous deaths	occurred in	1 family	with 4 living.			
Five	do.	do.	1	do.	4	do.
Nine	do.	do.	1	do.	2	do.
Ten	do.	do.	1	do.	1	do.

Insanitary conditions under which the fatal cases were placed.

We may next examine the insanitary conditions observed, which might be supposed to have affected the infant. We have no means of gauging their immediate influence on the causation of illness further than this. It is not uncommon for young children to make use of the house floor, yard, or passage instead of a closet. Supposing the matter deposited to be infectious, it is likely that other children in the house, or playing in the rear of the houses, would become infected.

The particulars recorded may be thus tabulated :—

Conditions	Child healthy before attack	Child ill before attack
Mother noted to be personally dirty...............	1	17
Houses dirty, but mother not observed to be so.	12	18
Pail-closets dirty, defective, or a midden privy...	9	11
Drains defective, yard defective or dirty, passage defective or dirty.	3	15
Other defective conditions, such as heaps of rubbish or stable manure within 100 feet.	3	1
Houses and people clean	3	13
Total	31	75

In the above analysis it will be noted that five cases of an indeterminate character are omitted, viz., 18, 23, 79, 83, and 100.

The analysis is so arranged that no case is repeated. The most important condition, so far as one can judge, is put first, viz., the dirty personal condition of the mother. Along with this goes a number of other defective conditions, which, however, are omitted for the purposes of this analysis.

In the subsequent sections these cases are omitted.

Practically, it may be taken that where the mother is dirty the house will be dirty in an aggravated sense.

Thus we may read the above first two sections: house dirty, children healthy, 13, unhealthy 35.

Similarly, line 3, dealing with dirty closets, does not include the dirty closets in lines 1 and 2, where the mother or the houses are dirty, but does include a number of other insanitary conditions.

This being understood, so far as such limited numbers permit of a conclusion, it would appear that a slovenly habit on the part of the mother is far more dangerous to the health of the child than any other insanitary condition.

In particular, it is notable that a generally dirty or defective condition of the closet is not necessarily fatal to infants, given a clean and careful mother. The figures are more surprising for the state of the house than for the effect of the closet. As regards the influence of defects in the drainage, yard, and passage, it must be remembered that the figures are very much modified by the exclusion of cases in the lines above. But the last line is not subject to this deduction, and appears to show that a fair measure of cleanliness in house and mother does not preclude ill-health in the child, given other unfavourable conditions. This rather adds to the effect of the facts in line 2.

The facts may be most usefully presented in this form :—

Conditions	Child healthy before attack	Child unhealthy
Mother slovenly	1	17
Other insanitary conditions ...	30	58

The general effect of these facts, then, is to reduce the relative influence supposed to attach to general insanitary surroundings as compared with that to be ascribed to the want of personal cleanliness and care on the part of the mother.

In fact, this probably represents the real state of the case.

A dirty mother allows infectious filth to accumulate on the floor, while a clean woman does not, even if the walls are broken and dirty, and it is the filth which gathers on floors and seats which is most dangerous.

If infection reaches the infants from the yard and closet, it is probably carried indirectly, and may almost as readily reach an infant in a clean house with a good yard and closet (so far as pail closets can be satisfactory) as an infant living in a house where these conditions are not satisfactory.

There cannot, in the aggregate, be the least doubt that the narrow and dirty passages often attached to the houses in the poorer quarters accumulate materials fatal to health and life.

There is, all the same, a deeper depth which is reached when the mother is personally slovenly and negligent, and in the effort after improvement it is necessary to realise how much may be effected by a resolute attempt to improve personal habits.

On the feeding of the 111 fatal cases.

We turn now to consider various points in connection with the feeding of these infants. It has been already mentioned that on consideration of all the facts, one concludes that a considerable number of these infants were practically starved.

The materials do not lend themselves readily to a simple analysis, but I have endeavoured to select the most salient facts, with a view to throw some light, if possible, on the origin of the attack.

First, then, what were the foods chiefly used by the 111 cases antecedent to their attack? I leave out of account the various other materials given, such as biscuits, rusks, bread, patent foods, meat, etc., and deal only with the milks consumed. Even if only a little milk in tea is used, it is entered as milk in the following analysis.

The 111 children were, as far as milk is concerned, stated to be fed as follows :—

Taking cows' milk	63
Taking cows' milk and Nestle's sweetened condensed milk	19
Taking Nestle's sweetened condensed milk alone	18
"Handy" brand	1
The breast	4
So-called sterilised Milk	1
No milk at all	5
Total	111

It is not permissible from these figures alone to draw any conclusion as to the relative incidence of fatal Diarrhœa on infants using cows' milk and condensed milk respectively.

The proportion of infants fed on one or the other varies greatly in different parts of the city, and the numbers are too small for any conclusion.

It is sufficient to note that 19 were using condensed milk alone, and that these would be less likely to receive infection owing to contamination of the food other than at home than would those using cows' milk.

It is certain that in nine cases infection was not derived from the milk. In the five instances, in which no milk at all was used, the infants were practically starved.

We have seen that the previous state of health of the infant is an important factor in determining the issue, and it is therefore interesting to know what foods those children were receiving who were stated by the parents to be healthy at the onset of the attack.

Of the 31 infants stated to be healthy prior to attack, we find that 27 were fed on cows' milk alone, three on cows' milk and Nestle's sweetened condensed milk, and one on Nestle's sweetened condensed milk alone. Hence, of the 63 taking cows' milk (less two whose condition as to previous health was indeterminate), 27 or 44·3 per cent. were stated to be healthy prior to attack.

Of the 19 taking both cows' milk and Nestle's condensed milk, three or 15·8 per cent. were previously healthy.

Of those, however, fed exclusively on Nestle's condensed milk, numbering 19 (less one indeterminate), only one was previously healthy, giving a percentage of 5·3 per cent.

Mode of keeping the milk used.

When the tin of condensed milk is once opened it is practically always kept uncovered afterwards.

Of the 63 instances in which cows' milk alone was used + 19 in which both cows' milk and condensed milk were used, in only 10 was the milk kept covered. In seven of these 10 instances the infant enjoyed good health up to the onset of the illness, which goes to show that the covering of the milk after boiling is a substantial protection. In three instances the milk was partially covered, and in two no statement is made. The food of the infant was, therefore, generally kept uncovered on the table of the living room, on a shelf in the scullery, on the slopstone, or occasionally in a cupboard, and was usually visited by crowds of flies.

This note is added to case 13, which doubtless applies to many other cases: "though the milk was covered, the sugar added was kept uncovered, and was visited by swarms of flies."

The sugar is often added to the milk before giving it to the infant, after it has cooled down. Assuming that flies can carry infection, it is evident that infection is liable to be conveyed in the sugar. The same fact is also noted in regard to two other cases.

Boiling of the milk.

Generally speaking, condensed milk is not mixed with boiling but with warm water, and the mixture is not boiled before giving it to the infant. With regard to cows' milk the practice varies. Rarely it is given mixed with warm water. More often the water is boiled and then mixed with the unboiled milk. When milk is stated in this enquiry to have been boiled, it is meant that, after arrival, the milk itself has been boiled. Very rarely it is mixed with water and sugar and the mixture boiled.

The number of instances in which cows' milk is stated to have been boiled, and in which the statement has been accepted, is 30; in 6 instances the statement is doubted, and in 2 it is rejected.

If we are to give our assent to these statements, this means that in these 30 instances the infection was added to the milk after boiling, or was otherwise introduced into the infant's system.

In various ways, then, the number of instances in which infection could have been carried to the house in the milk has been considerably circumscribed. On the other hand, supposing the cows' milk capable of giving the disease, in not more than 30 instances out of 61 was this ability destroyed, while condensed milk retained unaltered any harmfulness which it possessed.

Defective appliances.

Even when the best appliance for feeding is adopted, the greatest care is requisite, but the long rubber tube is almost certain to become foul sooner or later.

The bottle and long tube were used in no fewer than 56 instances, showing how strong are the forces of custom and convenience in spite of all our teaching.

On comparing, however, the disabilities to which the children so fed were exposed otherwise in the matter of feeding, one finds that only in 10 instances can one confidently say that there were not other defects in feeding equally or more serious.

This may be taken to imply chiefly that it is the more careless parents who continue to use the bottle and long tube.

Of the 31 children healthy at the onset of the attack 15 used the long tube, while of the 75 ailing children no fewer than 41 were using the long tube.

The same significance no doubt attaches to these figures. At the same time, it is but reasonable to conclude that the use of the long tube is not necessarily injurious to the general health of the infant, apart from specific infection, though an injurious effect is doubtless exerted in the majority of cases.

Other Errors.

It is, however, not only through the use of unboiled milk, through irregularity, excess or insufficiency of its meals, or through the use of unsuitable feeding appliances that the digestive tract of the infant is assailed.

There are other serious errors by which its health may be endangered.

Improper Foods.

The first of these consists in giving unsuitable foods in addition to or in place of milk, or in place of milk and barley water. The tendency of mothers to give the infant a bit of what is going is a universal one, and is only kept down by training and experience.

Then again, not a few mothers, when their infant is out of sorts, seek the advice of other women supposed to possess more experience and knowledge, with unfortunate results.

The following is a brief resume of what happens :—

Case 3—æt. 2 years. Fed on bits of what was going from a very early age.

Case 6—æt. 2 months. Fed on pobbies from the 9th to the 11th week. (Pobbies are bread and milk.)

Case 8—æt. 5½ months. Fed on bread and water and sugar; no milk given. Infants' cordial almost every night.

Case 9—æt. 7 months. Teething powders given.

Case 12—æt. 5 months. Nurse drunk, child's milk sour, just before attack.

Case 21—æt. 8 months. Crusts of bread dipped in bacon fat, tea-cakes, no milk given.

Case 23—æt. 1 month. Arrowroot boiled. No milk.

Case 24—æt. 9 months. Rusks from 3 months.

Case 25—æt. 9 months. Teething powders.

Case 31—æt. 7 months. Tea given.

Case 46—æt. 5 months. Biscuits given.

Case 51—æt. 9 months. Pobs given since 10 weeks old, also bread and butter.

Case 53—æt. 6 months. Biscuits given, child practically starved.

Case 56—æt. 7 months. No milk given, food given not ascertained; child starved.

Case 58—æt. 10 weeks. Rusks given.

Case 68—æt. 7 months. Bits from table, cabbage, gruel, cornflour, etc.

Case 73—æt. 4 months. Fed on slightly-baked flour and water, little or no milk. Infant starved.

Case 85—æt. 10 weeks. Sieve for the barley water was dirty.

Case 92—æt. 1 month. Gruel of oatmeal and milk.

Case 99—æt. 4 months. Pobs, rusks, cornflour, etc., anything recommended.

Case 108—æt. 4 months. Pobbies given, child probably insufficiently fed.

Case 110—æt. 6 months. Crusts of bread; bottle not properly kept.

The following is a classification in ages of the 111 infants :—

Ages in months at death.

0—	4—	7—	10—	12—	18—	2 years and upwards
25	35	24	4	16	4	3

The following are the ages at which the infants died who underwent the grave errors above mentioned :—

0—	4—	7—9	2 years and upwards
5	8	8	1

Of these 22 cases, only one, (No. 51), has been classified as having good health prior to attack. But it is too much to say that this infant had good health. At four months of age it suffered from indigestion. The mother allowed it to crawl about the floor while she went out, and it is probable that it had other liquids instead of milk.

These are by no means all the cases in which the infants had given to them unsuitable food. When this happened at an age exceeding 8 months, however, the case was not included in the above list.

Infants allowed to crawl on a dirty floor or on dirty ground.

In case 51 it is mentioned that the infant was allowed to crawl on the floor. This is no infrequent occurrence. The infant sucks its dirty fingers, or stuffs filth into its mouth. In this way, no doubt, many infants become tuberculous. Older children are allowed to crawl on the streets even, and pick up garbage. One mother, with whom I remonstrated, said that she dare not leave her infant on the sofa, as she had no cradle—quite recognising that the thing was wrong, but without contrivance sufficient to fix the child safely on the sofa.

On looking through the 111 cases we find :—

Case 2—æt. 6 months. Diet inadequate. Infant wasted; crawled about on floor and street. Illness ascribed to its eating a dirty and decayed tomato which it picked up.

Case 27—æt. 12 months. Played on the floor, which had been messed by a sister ill of Diarrhœa.

Case 37—æt. 12½ months. Infant put on the floor, with dummy teat.

Case 39—æt. 6 months. Often put on the floor.

Case 41—æt. 14 months. Allowed to play on dirty floor.

Case 51—æt. 9 months. Allowed to play on dirty floor.

Case 65—æt. 13 months. Allowed to crawl on street and eat garbage.

Case 74—æt. 18 months. Allowed to crawl on floor and dirty ground outside.

Case 103—æt. 10 months. Allowed to crawl on floor.

Case 109—æt. 9 months. Played on the floor with sister (æt. 3) who had Diarrhœa some days before the infant.

These facts are put forward, not by way of suggesting that older infants can be kept from crawling on the floor, because they cannot, but in order to make it clear that mere improvement in the milk supply or in methods of feeding will not suffice to stop Summer Diarrhœa. A special training in domestic care and cleanliness is also needed.

Young children mess the floor, and infants crawling about will contract Diarrhœa and other diseases unless cleanliness is practised.

The infection is sucked in from infected hands, infected clothes, and perhaps inhaled. It is quite possible that a certain number of cases of infantile Diarrhœa die of a pulmonary form of the infection.

Rubbing the gums of the infant.

There are, however, other ways in which infectious filth is introduced into the mouths of infants other than with food. It is a common practice to rub the infant's gums with the fingers to feel for the coming teeth, and "to ease the gum."

This was not recognised all at once as a point requiring attention, so that it is not mentioned in all cases. But the infant's gums were rubbed by the mother, grandmother, father, nurse, or some gossip in no fewer than 33 instances, usually frequently. The fingers used were, no doubt, usually not clean.

The following instances are notable :—

Case 6. Gums rubbed by mother. Mother wiped up messes made by child of neighbour suffering from Diarrhœa.

Case 19. Gums often rubbed. Grandmother's hands very dirty.

Case 38—æt. 8 months. Gums often rubbed; all the other children have had Diarrhœa before the baby.

Case 39. Gums often rubbed. Nurse has had Diarrhœa all the summer.

Case 40. Gums rubbed. Sister had previous attack.

Case 42. Gums often rubbed. Nurse a drunken woman.

Case 46. Gums rubbed by a phthisical grandmother. Ten deaths of infants have occurred in this family.

Case 47—æt. 9 months. Gums often rubbed; older child suffering from Tabes and green Diarrhœa.

Case 87.—Gums rubbed by mother, neighbour, and grandmother. This infant took ill August 15th. Grandmother nursed another infant who died of Diarrhœa, August 15th.

Case 88.—Grandmother played with baby's tongue with her fingers. She had an attack of Diarrhœa just before the infant.

Case 109.—Mother often rubbed gums. Another child had Diarrhœa just before the infant. They played on the floor together.

The dummy teat.

In another batch of cases the dummy teat comes into play. It is dipped in sugar swarming with flies. It falls frequently on dirty floors. The danger arising from its use is, perhaps, not so great as that attending the practice of rubbing the gums, but it is considerable, and of the same character.

On the modes of infection.

We have seen that there are many factors favouring the production and propagation of fatal Diarrhœa, especially among the poorest class, on the assumption that this is an infectious disease. Is this, in fact, an infectious disease in the ordinary sense?

Supposing the answer to be in the affirmative, we have then to consider why the disease remains at a low level of infectivity except at one particular period of the year, when it suddenly spreads with remarkable quickness.

Is Summer Diarrhœa infective in the usual sense?

We have seen that, if it is so, there exists more than sufficient opportunity for its propagation. The younger children when attacked soil their clothes, the seats on which they are placed, and, above all, the floor.

The mother or nurse treats the infant, to whom Diarrhœa is especially fatal, in such a manner as to favour the introduction of infection to the utmost.

If the disease is directly transmissible there should, therefore, be no difficulty in obtaining abundant evidence of its transmission.

And, in fact, when the cases are investigated with sufficient care, as in the above series, the abundance of material is as striking as unexpected.

The evidence of direct transmission is of the usual nature, viz., contact with a person previously suffering from Diarrhœa, or with someone who has been in recent and intimate contact with such a person, nearly always the former.

There is nothing new in this. The spread from person to person of Diarrhœa has been observed by physicians in institutions and by practitioners in private houses. But the extent to which this happens has not been, so far as I know, previously elucidated.

On examining our 111 cases we find that the child was exposed to infection directly in no fewer than 39 instances.

In 6 additional instances there is evidence of exposure, which, however, might not be accepted as sufficient, but which in the case of Enteric Fever would make a considerable presumption.

In 8 more there is some evidence of infection.

In 4 cases there is evidence of indirect exposure to infection.

In 8 instances there is evidence of subsequent infection.

In still 8 other instances there is evidence of previous and also of subsequent infection, but these are included amongst the 39 first mentioned.

We may restate the facts thus :—

In 52 instances there is evidence of infection in the same number of families, 39 of direct infection of the case investigated, 4 of indirect infection, and 9 of subsequent infection in still other instances.

In addition to this there are 13 other cases in which the facts of infection are not so strong.

As this is a matter of considerable importance, it seems desirable to give the histories of exposure to infection in some detail. First we will take the series of cases, numbering 39 :—

Case 3—æt. 2 years. The child, suffering from ulcerated mouth, was taken once a week to a doctor's surgery, where he was in company with other children suffering from Summer Diarrhœa. In addition, the mother had a slight attack of Diarrhœa before the child. The history of public institutions would, probably, serve to emphasise the possibilities of infection arising from the first source named.

Case 4—æt. 2 months. Took ill September 12th. Mother took her baby often to the house of a friend, whose baby was suffering from Diarrhœa. In particular she visited there on September 10th, September 11th, and September 12th.

Case 6—æt. $2\frac{1}{2}$ months. Took ill September 13th. The mother has an intimate friend whose baby began to be ill with Diarrhœa on September 1st. This baby she often took charge of, wiped up its messes, etc. She was at the same time in the habit of rubbing the gums of her own infant.

Case 7—æt. 18 months. Took ill September 14th. His sister (R., æt. 4) began to suffer from Whooping Cough and Diarrhœa on September 1st. The two had milk from the same cup; it may be assumed that the sister would freely infect her clothes and the floor.

Case 10—æt. 3 months. Took ill September 16th; a feeble, ailing infant; had been taken to out-patient department of a hospital (see case 3). Father, who slept with the infant, had a sharp attack of Diarrhœa beginning September 13th.

Case 11—æt. 1 month. Took ill September 16th. Brother (æt. 1 year) began with Diarrhœa on September 8th.

Case 13—æt. 2 months. A weakling; took ill September 18th. The maid had an attack of Diarrhœa beginning September 10th.

Case 20—æt. 4 years. Sister (æt. 8) had Diarrhœa immediately before him; occupied the same bed.

Case 26—æt. 5 years. Took ill October 2nd, probably tubercular. Mother has had colic and inflammation of the bowels for some time. She began to be ill with Diarrhœa about four weeks before case 26, and was ill a fortnight. Sister (æt. 8) began to be ill with Diarrhœa on October 4th. She slept in the same bed with case 26.

There is a possibility that this illness was Enteric Fever.

Case 27—æt. 12 months. Took ill October 6th. Her sister was taken ill in August with Diarrhœa, which continues.

Case 28—æt. 4 months. Grandmother, who has suffered from Diarrhœa for four months, often nursed this infant.

Case 34—æt. 4 months. Taken ill July 11th. A child next door began to be ill with Diarrhœa on July 4th.

Case 38—æt. 8 months. All the other children here, also their cousins, have had Diarrhœa before the baby.

Case 39—æt. 6 months. Taken ill about June 1st, died August 1st. Nurse had Diarrhœa for a considerable time. Her baby was brought to this house on August 8th, and began to have Diarrhœa a day or two after.

Case 40—æt. 2 months. Sister (æt. 2) had a previous attack.

Case 44—æt 5 months. Ill June 23rd. Twin brother died of diarrhœa on June 21st.

Case 45—æt. 14 months. Ill July 7th to 9th, then better; recommenced July 15th. E. H. (æt. 61) nursed case 45; began on June 21st to have Diarrhœa, which lasted to July 10th.

Case 47—æt. 9 months. Brother (æt. 16 months) has suffered for some time from "Tabes and green Diarrhœa."

Case 48—æt. 5 months. Brother (æt. 10) nursed case 48; had Diarrhœa before this case for a few days.

Case 53—æt. 6 months. Ill July 29th. Father slept with case 53; had an attack of Diarrhœa beginning July 24th.

Case 56—æt. 7 months. Mother died on July 13th, having had copious Diarrhœa for some days. Case 56 began a few days after to have Diarrhœa.

Case 61—æt. 9 months. Took ill August 2nd, died August 13th. A lodger had Diarrhœa in 2nd week of July. Brother (æt. 2) began to have Diarrhœa on August 19th.

Case 69—æt. 4 months. Taken ill August 31st and again on September 20th (relapse). Neighbour's child brought into the house suffering from Diarrhœa about a week before the first attack.

Case 73—æt. 4 months. Brother (æt. 3) has suffered from Tuberculosis of the bowels for 3 months, with green motions.

Case 77—æt. 4 months. Ill August 25th. A child often brought here from next door. Has had Diarrhœa for 4 months. This child died October 3rd.

Case 36—æt. 8 months. A neighbour's infant, while suffering from Diarrhœa, was brought here and allowed to use baby's bottle, which was not subsequently cleaned before use.

Case 81—æt. 15 months. A cousin next door has had Diarrhœa several times during the summer.

Case 82—æt. 6 months. Taken ill August 19th. Grandfather began to have Diarrhœa on August 13th. Next door, at the tripe shop, the woman began to have Diarrhœa on August 12th.

Case 84—æt. 5 months. Brother ill with Diarrhœa two weeks before this case. Slept in the same bed.

Case 88—æt 7 weeks. Grandmother had an attack of Diarrhœa just before the child.

Case 96—æt. 5 months. Ill August 7th. Brother (æt. 2) began to have Diarrhœa on July 27th. Mother began on August 17th.

Case 98—æt. 21 months. Neighbour next door has had Diarrhœa all the summer; occasionally came in here.

Case 99—æt. 4 months. Neighbour in case 98 lived here, and was grandmother to case 99.

Case 100—æt. 4 months. Ill August 8th. Mother died of Pneumonia. Had Diarrhœa severely from July 23rd to August 7th. A cousin had Diarrhœa beginning August 7th, which lasted 3 weeks. This may have been Enteric Fever.

Case 103—æt. 10 months. Had a slight attack of Diarrhœa in June. Began to have Diarrhœa again on August 11th. Intimate with neighbour whose child began to have Diarrhœa again on August 11th.

Case 104—æt. 16 months. Took ill August 12th. The mother very friendly with Mrs. X., who was ill with Diarrhœa from July 7th to July 13th. She took case 104 with her to visit Mrs. X. C. X. was ill with Diarrhœa from August 2nd to August 23rd, when she died.

Case 106—æt. 3 months. Ill August 12th. Child next door died of Diarrhœa on August 4th. Mother often visited there. Mrs. C. visited at the house of case 106 on August 13th, and took ill with Diarrhœa on August 18th.

Case 109—æt. 9 months. Sister (æt. 3) had Diarrhœa a few days before this case. These two played together on the floor.

Case 110—æt. 6 months. Ill August 12th. Mother often visited neighbour, along with case 110, and neighbour often visited here. Neighbour's child died of Diarrhœa on July 24th.

Indirect Transmission.

Case 43—æt. 3 months. Taken ill about June 30th. His nurse's child, (æt. 3 years) died in May of Diarrhœa and Measles.

Case 68—æt. 7 months. Ill August 31st. Was under the care of neighbour, whose child died of Diarrhœa on August 3rd.

Case 79—æt. 4 months. The woman from two doors off used often to come and chat at the door. She has had two children ill of Diarrhœa just before case 79, of whom one has died.

Case 87—æt. 8 months. Ill about August 15th. The grandmother of this child nursed a baby who died of Diarrhœa on August 15th, four doors away.

Cases of direct infection not included in the above, in which the person infected was attacked subsequently to the case investigated.

Case 18—æt. 9 days. Ill September 23rd, died September 28th. Brother (æt. 2) began October 10th.

Case 31—æt. 7 months. Ill in April, died September 21st. Twin brother began about two days after. Diarrhœa has continued.

Case 46—æt. 5 months. Ill about June 1st, died July 28th. Slight attack in boy (æt. 4) a few days after the death of case 46.

Case 50—æt. 1¾ years. Ill July 25th. Grandmother had Diarrhœa on August 3rd.

Case 51—æt. 9 months. Ill July 26th, died July 29th. Brother (æt. 3) began on August 8th to have Diarrhœa, which has continued.

Case 60—æt. 12 months. Ill August, died August 21st. Brother (æt. 2) began September 18th with Diarrhœa, which has lasted three weeks.

Case 71—æt. 3 months. Ill August 29th, died September 29th. Brother (æt. 6) began on October 3rd.

Case 97—aet. 21 months. Ill August 4th, died August 25th. Father began with Diarrhœa on August 22nd.

Case 62—æt. —. Ill August 2nd. The twin to case 62 took ill on August 5th, but recovered.

Cases in which the evidence of direct exposure to infection is less satisfactory.

Case 17—æt. 17 months. Brother (æt. 3) had Diarrhœa a month previously.

Case 16—æt. 17 months. A tuberculous child, who often suffers from Diarrhœa, frequently visits here.

Case 32B—æt. 9 months. Ill September 21st. A brother had Diarrhœa 4 months' ago and has been ill for 3 months. Case 32B had Diarrhœa also in May. It is possible that this is a re-infection.

Case 35—æt 5 months. A child living in the house opposite had Diarrhœa before case 35.

Case 37—æt. 12½ months. Ill about July 14th. Sister-in-law's child had Diarrhœa in June, and soiled the floor here.

Case 40—æt. 2 months. Sister (æt. 2) had previous attack. Date could not be ascertained.

Case 23—æt. 1 month. A brother had previously had attacks of Diarrhœa, but definite particulars could not be obtained.

Case 70—æt. 6 months. Ill August 30th. Previous case in house behind began August 17th.

Case 72—æt. 15 months. Ill August 29th. This Tuberculous child often had Diarrhœa, and appears to have been infected from brother H. who suffers from internal piles; this brother again was probably infected by another brother who died of Tuberculosis over 2 years ago.

This child had been under treatment for 2 months.

(?) Summer Diarrhœa.

Case 78—æt. 12 months. Had fever for a month before Diarrhœa set in; probably tuberculous, and infected by father.

Case 86—æt. 8 weeks. Father has occasional attacks of Diarrhœa.

Case 89E—æt. 3 months. Ill July 4th. Grandmother had severe Bronchitis in May and June. Mother died of Enteric Fever, August. This infant, no doubt, also died of Enteric Fever.

Case 92—æt. 1 month. The woman who nursed this infant had an infant who had been suffering from Tuberculous bowel for 12 months, and has had severe Diarrhœa during the summer.

The Autumnal Rise—The Housefly.

The above facts appear abundantly to prove that, given a certain intensity of exposure, Summer Diarrhœa passes from one person to another. They also go to show that, in fact, direct infection plays no small part in the amassing of the total number of fatal cases.

But they do not furnish any explanation of the manner in which the curve of Summer Diarrhœa shoots up in summer.

Direct infection under intense exposure is shown by the course of Diarrhœa at other seasons to be insufficient by itself to cause a widespread prevalence, at all events of the fatal form of the disease, and we have not as yet got much nearer to an explanation of the autumnal rise.

At the same time, a history such as we have given amply explains a certain measure of diffusion at all seasons.

In the endeavour to arrive at the explanation of the autumnal curve we may state our premises thus:—

The curve begins to ascend rapidly when the mean daily atmospheric temperature reaches a point somewhere between 60° F. and 63° F.

The rise in the number of deaths is, however, not always observed, especially if the rise of temperature occurs early in the season, even though the rise of temperature may be considerable—witness the years 1894, 1896, and 1899.

On the other hand, a rise in the number of deaths occurs with an increase of temperature, much slighter in amount, if this occurs later on in the season, as shown by the facts for 1895, 1898, and 1902.

It thus looks as if the rise might be dependent on some factor, itself dependent on the temperature, but having certain seasonal limitations.

This goes to diminish the influence of milk in so far as it forms a soil for infective matter which can reach it at the farm or elsewhere apart from specific infection.

As we have already seen milk as it arrives in the city can scarcely be the preponderating cause of fatal Diarrhœa.

We must, therefore, look for some other cause.

In the popular imagination fruit assumes a prominent place, and it is very possible that it should have a distinct place. But the rise of the autumnal curve usually precedes the advent of any fruit which could produce the effect.

Babies do not get fruit. If fruit were the cause, we should have first infection of older persons, and subsequently infection of infants from these. Nothing is more certain than that such a sequence cannot generally be established. Here, again, however, it is probable that contaminated fruit does add to the sum of Diarrhœa, though without materially affecting the rise of the curve.

There are one or two influences affecting Manchester, though to what extent they are operative in other towns I cannot say.

One of these is the method of removing nightsoil in the pails, which must to some extent charge the atmosphere with infective matter.

Another is the prevalent habit of shaking carpets in the street. In this way, whenever a child has Diarrhœa, a cloud of infective particles is scattered in the immediate neighbourhood of the house.

Doubtless these causes will operate more unfavourably on the food in adjoining houses when the temperature is high.

But, in the first place, the mode of spread is not from one house to the next, and in the second place these causes also should produce graduated effects. They are also subject to the observations on the failure of a high temperature always to produce the result.

We come thus, by a process of exclusion, to the house-fly. There is, certainly, a tendency for the house-fly to observe a definite season, though this tendency may be modified by a continuous high temperature at an early period of the year. It multiplies greatly in the Diarrhœa season. In 1902, which was a year of remarkably low Diarrhœa mortality, it was almost absent. It is, of course, no proof that the house-fly carries Diarrhœa to say that it occurs at the same time as Diarrhœa in the earlier part of the Diarrhœal season.

Both Diarrhœa and house-flies may be equally dependent for their occurrence on high atmospheric temperature, and may yet have nothing to do with each other.

Its claim rests on the fact that in no other way can the rise of the Diarrhœal curve be explained. We are, however, very far from having established a causal connection.

(1) To do that, we should have to show that the increase in number of house-flies is immediately antecedent to the increase of Summer Diarrhœa, and that the sequence is a constant one.

(2) We should have to show also that flies caught in Diarrhœal households were actually carrying bacilli of the coli group.

(3) Supposing we proved this, how is the question of infection of milk on the farm or in the town thereby affected.

There is reason to think that house-flies do not travel long distances. To this extent there would be less likelihood of infection generally being introduced on the farm.

On the other hand, the time afforded for growth of infective matter in the house is short, and if infection occurred at home by means of the house-fly it would have to be massive.

There would thus require to be an immense number of flies gaining access to the infant's food.

If infection were introduced on the farm, it would, undoubtedly, have time to multiply.

We have seen, however, that in a considerable proportion of the cases infection at the farm may be excluded.

(1) To fulfil the first condition is a work of time, and will require careful observation over a series of years. Something we have done last year, which will presently be given.

(2) With regard to (2), somewhat extended observations are needed. Last autumn the changes going on at the laboratory precluded many investigations Four batches of flies, however, were submitted to Professor Delépine, and from three of these bacilli of the coli type were recovered.

(3) Extensive observations were made by Mr. Hewitt on the occurrence of house-flies in infected households, and the results may be briefly summed up. It may, however, be said that often the answer to the question was self-evident from the fact that the wall-paper was thickly spotted with fly-dirt.

No observations were made for 19 out of the 111 households visited. In 10 flies were not numerous. Of the remaining 82, flies were numerous in 59, in tremendous numbers in 17, and in swarms in 6. The 10 households in which flies had not been numerous deserve attention.

Case 4.—This case was probably due to direct infection.

Case 22.—Diet probably quite insufficient, cows' milk said to be boiled? No explanation forthcoming. But the milk may be suspected.

Case 30.—Child probably has Tabes Mesenterica.

Case 33.—Frog at two weeks. Possibly Tuberculous. Cows' milk unboiled.

Case 40.—Incomplete history of infection. Child Tuberculous? Nestle's condensed milk.

Case 48.—Probably direct infection.

Case 53.—Child practically starved. Infected from father directly.

Case 67.—Child ravenous. Previous attack of Diarrhœa. Tuberculous (?)

Case 72.—Child Tuberculous. Strong history of tubercular infection.

Case 105.—No explanation. Cows' milk boiled.

The conditions mentioned as necessary to be fulfilled before a connection can be made out between the occurrence and number of house-flies and the spread of Diarrhœa could only be ascertained by exact observation. Accordingly, observations were instituted at a number of different points early in July by means of glass bell traps. These were charged with beer, which attracts and stupefies the flies, and were emptied at a fixed hour once a day. The flies were then counted, and the trap cleaned and recharged.

The points at which observations were made were as follows:—

1. At four different stations belonging to the Cleansing Department.
2. In three rooms of the Administrative Building at Clayton Hospital.
3. In two houses in Newton Heath under the charge of Inspector Hewitt.
4. In one house in Hulme under the charge of Inspector Archer.
5. In two houses in Ancoats under the charge respectively of Mrs. Bostock and Miss Sefton, Health Visitors.
6. In one house in Chorlton-upon-Medlock under the charge of Mrs. Clift.
7. In one house in Hulme under the charge of Mrs. Clift.

In all, 14 sets of observations were made.

In order to reduce these to reasonable compass it has been found necessary to take the number of flies caught per week, and only complete weeks of observation have been taken.

Unfortunately, the observations were not begun early enough to show by how much the advent of flies preceded the increase in the fatality of Summer Diarrhœa.

It is certain, however, that they only preceded the increase in Diarrhœa by a short time; and if we may assume that a mean daily temperature of 60° F. and upwards is a determining factor in the definite advent of house-flies, it is probable, from examination of the meteorological data, that the house-flies first began to be abundant on June 29th, June 30th, and July 1st.

These observations show, however, that the advent of the house-fly definitely preceded the increase of Diarrhœa.

The deaths from Diarrhœa in corresponding weeks are given in another table, and these tables can be directly compared.

The manner of occurrence of the house-flies day by day deserves attention.

It will be noted that all these observations were made under cover, the traps being placed on a table in the living rooms, or in the case of the offices of the Cleansing Department, in the window.

In every set of observations an outstanding feature is the great variation in numbers from day to day.

Or, again, a marked increase will occur, and last for a few days or for a week. These periods of increase or decrease do not correspond in the different sets of observations.

There are, therefore, other influences at work besides weather, and it is permissible to suppose that the increases have relations to the times at which fresh swarms have been produced at different points.

The tables alluded to above, showing the deaths from Diarrhœa week by week, and giving the number of flies caught at different points during the same periods, are herewith given.

1904.

Deaths from Diarrhœal Diseases in Manchester in the weeks ending on the dates given below.

First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
Jan. 9	5	April 9	3	July 9	5	Oct. 8	23
„ 16	1	„ 16	5	„ 16	...	„ 15	11
„ 23	2	„ 23	4	„ 23	14	„ 22	3
„ 30	4	„ 30	3	„ 30	48	„ 29	3
Feb. 6	1	May 7	5	Aug. 6	77	Nov. 5	4
„ 13	1	„ 14	3	„ 13	91	„ 12	1
„ 20	2	„ 21	1	„ 20	107	„ 19	...
„ 27	2	„ 28	1	„ 27	85	„ 26	3
Mar. 5	2	June 4	3	Sept. 3	68	Dec. 3	3
„ 12	5	„ 11	...	„ 10	43	„ 10	2
„ 19	2	„ 18	1	„ 17	36	„ 17	4
„ 26	5	„ 25	4	„ 24	28	„ 24	3
April 2	2	July 2	5	Oct. 1	24	„ 31	3
Total...	34	Total...	38	Total ...	626	Total ...	63

City Total 761

RECORD OF FLIES CAUGHT AT VARIOUS PLACES IN MANCHESTER DURING 1904, IN THE WEEKS ENDING ON THE DATES GIVEN UNDERNEATH.

	Mrs. Clift, C.-on-M.	Miss Naylor, 51, Queen Street, Hulme	Miss Sefton, 11, Cyrus Street, Ancoats	Mrs. Bostock, 85, Tame Street, Ancoats	Mr. Hewitt, 240, Droylsden Road, Newton	16, Culcheth Gates		Mr. Archer, 331, City Road	Cleansing Department Depots								Clayton Hospital			
									Oldham Road		Water Street		Carrington		Gorton					
						Ordinary Flies	Blue-bottles		House Flies	Blue-bottles	House Flies	Blue-bottles	House Flies	Blue-bottles	House Flies	Blue-bottles	Dining Room	Kitchen	Sitting Room	
																	27	88	3	118
July 9	45	64	100	39	59	...	...	...	134	6	529	9	179	...	...	...	48	240	46	1498
,, 16	585	404	343	182	73	...	...	...	66	7	1695	45	156	...	335	6	35	85	22	4039
,, 23	400	527	297	247	45	...	...	...	214	5	2380	71	121	...	743	8	22	135	19	5234
,, 30	323	614	334	161	67	143	6	228	297	6	1902	7	180	1	1434	2	176	756	62	6699
August 6	386	676	690	534	123	489	2	731	477	12	8959	86	1612	2	2253	...	357	1614	78	19081
,, 13	489	807	308	380	229	534	7	500	1422	34	9114	29	804	...	1387	8	324	2054	10†	18440
,, 20	477	518	136	406	213	764	14	334	1597	38	1442	31	193	...	603	9	503	1259	(?)...	8537
,, 27	1053	500	113	432	117	232	...	388	820	10	1460	23	127	...	447	11	433	413	30	6609
September 3	683	660	419	436	115	166	...	335	2239	51	1903	33	180	...	1477	13	271	742	79	9802
,, 10	321	606	257	290	155	146	...	345	1548	22	1395	18	158	...	647	14	66	786	63	6837
,, 17	498	477	305	263	120	393	...	590	1182	10	338	5	183	...	444	10	75	545	47	5485
,, 24	266	625	217	213	152	272	...	849	1296	9	606	11	63	...	365	6	119	396	35	5500
October 1	219	296	105	116	121	200	...	313	913	5	207	1	321	1	131	4	123	505	61	3642
,, 8	45	223	77	64	67	84	...	166	476	...	112	2	613	...	75	2	156	180	56	2398
,, 15	34	239	139	46	64	46	...	150	402	2	95	...	348	2	43	3	92	304	61	2070
,, 22	47	267	125	56	44	113	4	64	152	...	58	...	333	1	61	4	148	453	284	2214
,, 29	3	283	54	22	47	61	1	27	171	2	27	...	410	...	13	1	205	367	132	1826
November 5	1	187	19	23	35	24	...	20	100	1	12	...	93	...	14	1	89	79	29	727
,, 12	...	86	4*	12	...	4	...	28	106	1	7	...	23	...	2	...	32	22	7	334
,, 19	...	...	...	...	...	...	...	20	50	...	2	...	3	...	4	...	...	...	...	79
,, 26	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	3
December 3	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	3
	5875	8059	4042	3922	1846	3671	34	5094	13662	221	32243	371	6100	7	10478	102	3301	11023	1124	111175

* Record for 2 days. † Record for 1 day.

It will be noted that there are great differences in the numbers and proportions of flies caught at different places in the same week.

Even, however, in the case of different rooms at one house, as for example at Clayton Hospital, it is notable that an increase may coincide in one room with a decrease in others.

One observer also calls attention to the increase in a set of observations in a private house, which occurs on baking day. No doubt, this applies also in other instances. Probably other domestic changes, also, would produce a similar effect.

There is, however, a general influence of weather conditions perceptible. But even when the numbers are taken in weeks the same local variations are noticeable.

We thus learn that the house fly is eminently migratory, and passes from house to house, whatever may be its places of resort *en route*.

As regards the relations between the total numbers of the house-fly captured week by week and the number of deaths from Diarrhœa, we are in a position to say :—

1st. The advent of the house-fly in numbers precedes, but only by a little time, the increase in the number of deaths from Diarrhœa.

2nd. From the observations at Clayton Hospital it appears that the house-fly was present in considerable numbers on July 1st and July 2nd, and the increase of deaths began in the week ending July 23rd.

3rd. It is likely, had all the observations been then available, that the total number of house-flies (except at Water Street) would, in the week ending July 9th, not have fallen much short of the number in the week ending July 16th.

4th. In comparing the number of flies captured week by week with the number of deaths in this and subsequent weeks, these points require to be borne in mind.

The number of house-flies captured does not correspond closely with the numbers existing.

Wet weather would, of course, drive the flies into the house.

With a limited number of observations, local disturbances exercise a very perturbing effect.

The number of deaths does not necessarily correspond to the number of cases.

All this being understood, we note that the total number of house-flies captured rises steadily up to the week ending August 6th, in which it culminates. This relation is much more strongly marked if we omit the observations at Water Street.

From the week ending August 6th the numbers steadily decline, except for a slighter rise in the weeks ending September 3rd and 10th.

After September 10th the numbers gradually fall, descending swiftly after the week ending October 22nd.

From the table giving the deaths week by week, it will be seen that the number of deaths culminates in the weeks ending August 13th and 20th, diminishing from this point onwards without interruption.

The general level is reached in the week ending October 22nd.

If we assume a causal relationship between the number of flies in circulation and the number of deaths from Diarrhœa, it would appear that the average period required for the sequence is more nearly a fortnight than a week.

It is noticeable that the descent in the number of deaths precedes the diminution in the number of flies. It is possible that this is due to exhaustion of material, since, apart from the action of flies, there is much direct infection, and this ceases to have a potent action.

If we could ascertain accurately the dates at which an attack of fatal Diarrhœa commences, we should have another and perhaps a better means of comparing the number of flies caught with the number of fatal cases.

Unfortunately, in a number of instances, the cases could not be investigated because the family had left, or because the house was closed during the day. From 10 to 15 per cent. of the cases thus fail to be fully elucidated.

There are also inaccuracies as regards the precise date of commencement.

Taking, however, the cases in which a determination of the dates of attack are ascertained more or less correctly, we get the following table, from which it will be seen that a remarkably close correspondence exists between the

numbers of the house-fly caught in any week and the fatal cases commencing in the same week :—

Table showing the Number of Fatal Cases commencing in the weeks ending on the undermentioned dates, also the Number of Flies Collected in corresponding weeks :—

	July 2nd	July 9th	July 16th	July 23rd	July 30th	Aug. 6th	Aug. 13th	Aug. 20th	Aug. 27th	Sept. 3rd	Sept. 10th	Sept. 17th	Sept. 24th	Oct. 1st	Oct. 8th	Oct. 15th	Oct. 22nd
Investigated by Inspector Hewitt...	1	3	8	3	5	20	10	8	9	6	2	9	9	4	5	...	1
Investigated by other Inspectors...	3	11	15	37	65	100	93	45	25	26	16	14	4	6	2	1	1
Total number of fatal cases.... ...	4	14	23	40	70	120	103	53	34	32	18	23	13	10	7	1	1–566
Number of flies collected	Considerable.	Considerable.	4,039	5,234	6,699	19081	18440	8,537	6,609	9,802	6,837	5,485	5,500	3,642	2,398	2,070	2,214

The effect of this inquiry is, therefore, to increase the probability that flies act as transmitters of Summer Diarrhœa, and that they may take a considerable share in producing the autumnal rise.

The next point which requires demonstration is that house-flies do, as a matter of fact, convey infection.

Owing largely to alterations in the bacteriological laboratories, it was not possible last year to do much in this connection.

It is true other observations have been made showing that the house-fly does, as a matter of fact, carry infection ; but it seemed desirable to prove conclusively not only that house flies have this power but that, as a matter of fact, they do carry the infection of Summer Diarrhœa. This we hope, with Professor Delépine's aid, to investigate later on.

Meantime, it must suffice that a collection of flies was made in four different houses affected with Diarrhœa in such a manner as not to increase the amount of impurity on the flies at the point of time at which they were killed. On three of these groups, colon bacilli were found, and on one of them two distinct species.

This is, however, only a part of the demonstration required.

So far, then, as our observations last year go, they tend to confirm the impression that the common house-fly has to do with the transmission of Summer Diarrhœa.

It may justly be urged that if the house-fly is a potent influence in the dissemination of Diarrhœa, exactly the same is applicable to Enteric Fever, which ought, therefore, to increase in a similar manner.

As a matter of fact it does, though to a much smaller extent. It is by no means certain, however, that the increase in Enteric Fever is not considerably greater than appears on the surface, and there is some reason for supposing that a by no means negligible portion of the deaths ascribed to Summer Diarrhœa may in reality be due to Enteric Fever.

In some cases it almost certainly is so. In others, the illnesses are of so similar a character that it is not easy to distinguish between them.

Here, also, there is room for further investigation.

A hypothesis suggested by the manner of spread of Diarrhœa which has previously been considered is that an overgrowth of the specific organism of Summer Diarrhœa takes place in the soil, and comes to the surface in the Diarrhœal season.

The facts are, however, capable of explanation by the movements of the house-fly, which will cause inoculation of infection in all liquids capable of nourishing the specific organism, as well as on over-ripe fruit, etc.

If capable of explaining transmission from house to house, the migrations of the house-fly are also capable of explaining a general and rapid increase of the infective micro-organisms.

Conclusions.

The conclusions arrived at as the result of this enquiry may be thus summed up. The high fatality from Summer Diarrhœa is largely due to the ailing condition of the infants when attacked.

Their previous bad health is due to a variety of causes. Of these the most serious are slovenliness on the part of the mothers and ignorance of what is necessary so that an infant may be well nourished.

But their health is also assailed by a variety of unhealthy conditions, especially by dirty floors, insanitary closets and back passages, dirty fingers, etc., introduced into their mouths, occasional clouds of dust, and so forth.

Yet, in spite of all this, infants fed at the breast even in unfavourable situations remain comparatively well, and generally escape Diarrhœa, and even when fed on cows' milk they may enjoy good health when reasonable precautions are taken.

The immunity of breast-fed infants is surprising in the light of what we have found parents doing in the way of rubbing children's gums, and of other errors.

The percentage of such children attacked is fully explained.

It is probable that children fed at the breast are not allowed to crawl about dirty floors to the same extent as other infants.

With regard to the mode in which infection is introduced, we have seen that direct infection plays a large part. The same is true of Enteric Fever, when once the disease has become disseminated by a faulty water supply.

This does not explain why the disease attacks so many fresh houses within a comparatively short time in the late summer and autumn.

Partly it may be that the disease is imported from without by milk, We have seen, however, that there is strong reason to doubt whether the autumnal rise can in this way be explained.

There does appear, on the other hand, to be considerable reason for believing that the disease is often carried from one house to another by the common house-fly, sufficient, in fact, to form a basis for practical action.

What, then, are the lines of action to which these enquiries point?

It cannot be doubted that the question is one of great moment.

The imprint made on the future health of these poor children by their treatment during the first few years of life is probably deep and lasting.

It is of these neglected units that our future citizens are made.

Clearly, the all-important thing is that the mothers should be as intelligent and skilful as they are for the most part affectionate.

The pleasure of having healthy children, and the numerous little cares which mothers would have to exert to that end, would go far to banish slovenliness and selfishness.

I.—The first and most important thing is to make a real and sustained effort to train girls and young mothers in domestic management and in the proper feeding and care of children.

At present, this vital necessity of education is hardly touched. It is not that the action hitherto taken is not on right lines. It is wholly inadequate. Nor is it easy to see how the necessary training is to be given.

It is true the Education Department might make elementary instruction of the necessary kind compulsory on school girls. But it can only be offered to girls who have left school. It may be possible to do more than is being done by employing skilled and trained women to visit poor homes, and instruct those mothers who appear to need instruction in the things necessary to preserve the health of the infants.

This instruction would embrace such points as the following:—

1. The necessity of cleanliness in the house, and especially the importance of clean floors.

2. The precautions needful in the storage of food, and especially its protection from dirt and flies.

3. The clothing requisite for the health and safety of the child.

4. The amount and kind of food which it needs.

5. How to prepare it, in the case of an infant artificially fed.

   The last is a technical matter, and needs intelligence, skill, and patience. If one or two municipal teaching centres were established, teachers and mothers might also receive practical instruction there.

6. Mothers might also be taught what they ought not to do in many particulars, as in rubbing the child's gums, giving it teething powders, feeding it on unsuitable food, allowing its clothes or bed things to get dirty.

A great extension of this house to house work is certainly needed.

II.—Mothers ought to be prevented from giving their young children starvation foods, and cases in which it could be proved that they had done so, after receiving instruction, should be dealt with.

III.—Where insanitary conditions of a permanent character are present they should be dealt with. This remark applies to the numerous narrow passages still in existence, lined with pail closets, and fetid in summer time.

IV.—Where parents are in such poverty that assistance is needed, either provision should be made from private charity or they should be compelled to apply for poor relief.

The claim of the unprotected infant to food should be enforced, and indeed is, at present, enforced in part.

V.—The question of cows' milk is an important one. But, in the main, it is embraced in the above recommendations.

It will be further considered by itself.

All food to be used by infants should be required, by law, to be protected from flies.

It is, however, to the extension of instruction that we must chiefly look for real improvement.

The following statistics complete the facts usually supplied year by year for this disease:

The numbers of deaths in quarters are as follows:—

Diarrhœa and Simple Cholera Deaths in Quarters 1894–1904.

	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	Mean for 10 years	1904
First Quarter......	47	51	37	49	55	46	41	45	33	48	45	34
Second Quarter...	55	59	78	50	49	53	66	32	33	49	52	38
Third Quarter.....	212	574	391	803	807	948	562	865	120	303	559	626
Fourth Quarter...	61	220	66	62	179	74	153	74	110	107	111	63
	375	904	572	964	1090	1121	822	1016	296	507	767	761

By means of the following table we are enabled to observe the comparative degree of severity with which different districts of the City have been visited. The figures should be compared with the average figures for the ten years 1894-1903.

1904.—Deaths and Death-rates from Diarrhœa and Simple Cholera in the various Divisions of the City.

Statistical Divisions		Estimated Population	Deaths	Death-rates	Death-rates under 1 year per 1000 births. 1904	Average 1894-1903
	City of Manchester......	558,335	761	1·36	34·06	32·46
I.	Manchester Township.	130,742	243	1·86	40·92	39·80
II.	Northern Districts......	177,056	206	1·16	30·09	26·78
III.	Southern Districts......	250,537	312	1·25	33·03	31·51
I.	Ancoats	44,141	76	1·72	35·40	40·69
I.	Central	27,787	56	2·02	50·96	46·67
I.	St. George's	58,814	111	1·89	41·10	36·03
II.	Cheetham	39,531	17	0·43	10·74	19·17
II.	Crumpsall	9,139	5	0·55	15·23	19·56
II.	Blackley	9,311	6	0·64	23·53	9·43
II.	Harpurhey	18,825	10	0·53	13·13	27·37
II.	Moston	15,389	13	0·84	25·51	15·35
II.	Newton Heath	37,552	46	1·22	31·42	26·58
II.	Bradford	24,553	59	2·40	52·52	41·12
II.	Beswick	12,123	35	2·89	60·81	29·45
II.	Clayton	10,633	15	1·41	38·35	43·77
III.	Ardwick	43,192	61	1·41	38·46	30·29
III.	Openshaw	28,146	37	1·31	27·96	36 17
III.	West Gorton	30,738	53	1·72	47·15	43·41
III.	Rusholme and Kirk ...	25,886	11	0·42	12·69	22·98
III.	Chorlton-upon-Medlock	57,093	46	0·81	23·78	24·51
III.	Hulme	65,482	104	1·59	39·16	31·94

By means of the following figures we are enabled to compare the fatality from Diarrhœa and Simple Cholera in Manchester with that prevailing in other parts of the country, and it will be seen that Manchester in 1904 occupies its usual position relative to other towns.

1904.—Diarrhœa and Simple Cholera Mortality.—Rate per 1,000 living, compared with Mean of Five Years.

	1899	1900	1901	1902	1903	Mean	1904
England and Wales	0·98	0·69	0·91	0·38	0·50	**0·69**	0·86
*76 Great Towns...............	1·21	0·94	1·23	0·54	0·71	**0·93**	1·20
London	0·93	0·78	0·87	0·54	0·64	**0·75**	1·04
City of Manchester	2·05	1·52	1·86	0·54	0·91	**1·38**	1·36
Manchester Township	2·60	2·12	2·72	0·73	1·41	**2·40**	1·86
North Manchester	2·00	1·10	1·61	0·44	0·64	**1·45**	1·16
South Manchester	1·78	1·45	1·56	0·50	0·84	**1·53**	1·25
*142 Smaller Towns†	1·22	0·81	1·09	0·35	0·43	**0·98**	0·90
Rural Districts	0·76	0·48	0·65	0·22	0·31	**0·61**	0·46

* The rates for 1901 and previous years are for the 33 Great Towns and 67 Smaller Towns. † The rates for 1902-3 are for 103 Smaller Towns.

The following table supplies meteorological data for the third quarter of the year, the season in which the disease is most prevalent :—

Third Quarter of the years	Mean Temperature	Rainfall, Inches	Humidity, per cent.	Diarrhœa and Simple Cholera Mortality. Annual Rate per 1,000 living
1888	56°·5	11·2	77 %	1·36
1889	57°·7	10·5	73 %	2·61
1890	58°·8	8·1	74 %	2·28
1891	58°·2	12·8	79 %	1·57
1892	57°·0	12·5	78 %	2·07
1893	60°·4	10·7	74 %	4·95
1894	57°·8	9·0	78 %	1·55
1895	60°·4	11·2	77 %	4·17
1896	58°·5	9·7	76 %	2·93
1897	58°·9	9·7	73 %	6·01
1898	60°·1	6·1	74 %	6·00
1899	60°·8	7·7	75 %	6·96
1900	60°·3	9 6	78 %	4·14
1901	61°·9	6·5	74 %	6·33
1902	57°·6	5·9	78 %	0·88
1903	57°·8	12·3	77 %	2·19
Mean	**58°·9**	**9·6**	**76 %**	**3·50**
1904	60°·2	6·9	73 %	4·48

INFANTILE MORTALITY.

In the Report for 1903 I discussed briefly some general questions affecting the improvement of the physique of Manchester citizens, and it is unnecessary for this year to enter fully into the question.

But as I believe this question to be one which most profoundly concerns public health, I shall briefly recapitulate the main points of the position.

The education of children must necessarily fail unless the pupils are healthy and well nourished. There may be exceptions to this rule, or apparent exceptions. But it has been abundantly proved that underfed children cannot be taught much. They are disabled from learning, and in return they disable the teacher. It is from the ranks of the underfed children that we get the most abundant supply of the vicious and criminal classes. It is largely these children who swell our death registers, at more advanced ages, under the heads of Heart Disease, Phthisis, Lung Disease, and many other causes of death.

The excellent investigations into the health of school children which have been made for Edinburgh, Aberdeen, Dundee, and Salford abundantly prove that this must necessarily be so.

Quite inadequate attention has been, even yet, devoted to the disabling affections of children at school, comprising affections of the eyes, affections of the ears, Lung Diseases, Heart Disease, and infectious illnesses, although I fully recognise the excellent work done by the Medical Officer of the Education Department, and the impossibility of overtaking such arrears all at once.

Nor has adequate provision been made for securing attention to these, and their proper treatment.

A magnificent opportunity is offered to educational authorities for seeing that the health of children is properly looked after, and it is moreover a duty incumbent on them, since on its performance depends the success of our educational systems.

It is, however, necessary not merely that school children should be looked after, but that children at younger ages, and especially infants, should also be seen to, since at these earlier ages much, and frequently irreparable, damage is inflicted on the constitutions of children by ignorant and negligent management.

The first thing requisite, therefore, is to have a race of young women, the mothers of the future, who understand in some degree the duties of a wife and a mother.

Broadly speaking, the function of the woman is to produce and rear children, and her duty is to produce and rear healthy children. The requirements of industrial life, however, have largely deprived young women of the opportunity of learning what is required of them in their maternal relation, and still more of the desire to do so.

It is necessary for the general welfare that young women should be well grounded above all in this knowledge.

In my opinion, whatever else girls may or may not be taught, it should be absolutely compulsory on them to get a thorough grounding in certain domestic branches of knowledge before leaving school, and they should not be allowed, generally speaking, to leave school until they can show a competent acquaintance with those branches, unless provision is made for their subsequent education.

A girl should know how to cook a variety of common articles of food, and to sew and mend. She should know, also, how to clean a house, and when a house can be regarded as clean. She should be taught the dangers to health arising from filth. The course should comprise the properties and prices of suitable food. She should learn how to clean, manage, and feed infants and young children. She should also know something about infectious diseases, their dangers, and how to act when they occur.

All boys and girls should be taught the elementary principles of personal hygiene.

The knowledge embraced in the course which I have sketched should be intimate and practical.

Such a course as the above should be regarded as the necessary feature of a girl's education, and nothing should be permitted to displace it.

If this position be accepted, the next question is, who is to give the instruction? and the answer is not easy to supply. The education of teachers has not, so far, embraced these most vital requirements, and, no doubt, to make teachers competent to give the necessary instruction a kind of training is needed, which they have not hitherto received. Yet the need is urgent, and whatever further expense is required for the training of teachers, or for the payment of such specially trained persons, should be cheerfully encountered. The money will speedily be recouped in the improved physique and capacity of the generation trained by such teachers.

It has been put forward that the girls so taught will forget their instruction and training after they have left school. That will depend, of course, on the thoroughness, character, and duration of the instruction.

Moreover, if the education so given be real, a much larger number of young women will put themselves about to take further instruction in continuation classes.

The object aimed at, however, is of such overwhelming importance that nothing should be allowed to interfere with its realisation.

Unless a girl shows a thorough intimacy of acquaintance with the subjects named, it should, in my opinion, be obligatory upon her to attend continuation classes.

It is, however, not merely the education of girls and young women that is concerned in the special training of teachers in hygiene and domestic economy.

The whole of the preliminary, and the greater part of the entire work to be done in noting the physical condition of school children will rest upon the teachers.

Neither as a matter of economy, nor in point of efficiency, can this work be profitably placed on other persons.

As has been urged on previous occasions, the teachers have so many opportunities of observing their scholars—at their tasks, while performing physical exercises, and during the progress of school games—that any teacher of reasonable intelligence cannot fail to perceive when there is anything seriously amiss with their health. The important thing is to train their appreciation, so that they may form a fairly rapid and just estimate of what it is that is wrong, and of the means by which it may best be put right.

The sphere of the medical officers will then be to revise the judgments of the teachers in cases of doubt and difficulty, and to define their lines of action.*

The courses of instruction, both for teachers and for the older girls, should be restricted as much as possible, and should be thoroughly practical, opportunities being made to illustrate the subjects taught by practical examples. Theoretical teaching in such matters, without demonstrations, would have very little value.

It has been said that the education of the older girls and of young women should embrace the management of infants and young children. Here, again, the question of the training of teachers becomes very important. Where suitable crèches exist, the nucleus of a training school is already present. But it may be doubted whether the existing crèches are, in general, well adapted for teaching. Or, rather, it is certain that they are not.

What is required is a central hall for teaching purposes, with rooms leading off it. With this school should be associated a museum of feeding appliances and a teaching kitchen. With the school might also be associated a plant for

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* I am informed by Dr. Ritchie that he is engaged in giving such a course of instruction to teachers.

the modification and sterilisation of milk for infants, either on the lines of St. Helens, Liverpool, and Battersea, or with such modifications as the experience of local experts may suggest.

I am not at all certain that day crèches are much called for in Manchester. At all events, they do not appear to flourish. This arises, in no small measure, from the manner in which the population is housed. Crèches are much more likely to be useful where people are housed in tenements and where by consequence there are a large number of infants belonging to poor families within a small space of ground. There is, then, no great distance to cover in taking the infant to the crèche.

Where, however, the population is not crowded on the site, as is usually the case in Manchester, the distance which the mother has to carry her infant acts as a deterrent, and there is difficulty in getting the infants brought in. Generally speaking, therefore, day nurseries—that is to say, those which might be supposed useful to working mothers—are not regarded with much favour. Another factor which militates against day crèches in Manchester is the comparatively small proportion of mothers in Manchester who go out to work. No doubt there are a considerable number over the whole City; but the number in any one district is small.

If, however, there is not a great call for day crèches as charitable or semi-charitable institutions, there is a very great and pressing need for the establishment of crèches for teaching purposes.

For both purposes it is clear that such establishments should be in the crowded parts of the City, and I am of opinion that a school crèche should be founded somewhere in Ancoats or Hulme.

It is evident that the full advantage of an organised supervision over the health of children at school cannot be obtained unless at the same time every effort is made to ensure as much attention as possible to the health of children prior to their arrival at school.

The chief means by which this may be effected is the compulsory education of older girls and young women in the elementary principles of hygiene and domestic management.

But, in addition, there is needed the systematic work of a staff of district visitors, as supplied in Liverpool and Birmingham under the Corporation, and in Manchester by the Ladies' Public Health Society.

These visitors require, however, to be carefully trained before entering on their very important duties, otherwise it is only in exceptional instances that the full results can be expected.

A great extension of this work is indicated. It is too much to expect that the necessary funds will be supplied by charity, and it is not good for the continuity of the work that it should be dependent on that source of income.

Yet, at the present time, one cannot expect that the public funds will be available.

Nevertheless, the need for such extended teaching as a present instalment requires to be mentioned.

To recapitulate. In improving the physique of the next generation three changes are indicated, all, no doubt, requiring a considerable increase of expense:

1. Special training of teachers in the elementary principles and practice of hygiene so far as these relate to children.

In the case of female teachers there is required in addition a special training in domestic management and in the care of infants and young children.

2. A course of practical instruction in domestic hygiene and economy should be made compulsory and primary for all girls, and also for young women who have not shown a sufficient knowledge of such subjects while in attendance at school.

3. As a control, the methods at present adopted through health visitors, or, better, through lady inspectors, to instruct and assist mothers in the management of their infants and young children should be improved and extended.

There is a necessary connection between sections 1 and 2 of the above statement, but section 3 is now, and should in my opinion continue to be, attended to by the Sanitary Committee.

It has now come to be regarded as an axiom that insufficiently-nourished children cannot be educated and may be injured by their school tasks, and the important question arises how a sufficiency of nourishment can be secured for them. The first thing necessary is clearly to have some means of determining when children are not being adequately nourished.

No better means suggests itself in the first instance than the observations made by the teacher. The value of these, however, will depend largely on the training of the teacher. Once a reasonable belief is established that any particular children are not receiving a sufficiency of suitable food, it becomes easy to observe the subsequent course of events by taking the weight of the children at regular intervals.

In any doubtful cases the Medical Officer to the Education Authority would give his opinion.

In seeing that children receive sufficient food, it would be a profound mistake to allow parents to throw off their responsibilities.

It thus becomes necessary to determine whether parents are in a position to discharge their responsibility to the children.

Under the recent order of the Local Government Board, the investigations necessary to establish the ability, or inability, of the parents to supply sufficient nourishment would seem to devolve on the relieving officer. With him would rest largely the determination of the form which relief should take, whether it should be given by way of loan or otherwise, and whether action should be taken against the parents.

If this important work is fully carried out it will throw much additional work on the relieving officers, and it will require much care for its discharge.

In any case, it is now clear that the effectual supervision of the feeding of school children is an integral part of the educational machine, more especially since drill has become generally carried out.

Although I do not propose to pursue further the general question of the condition of young children, it does appear desirable to give some details regarding the mortality of infants under one year of age, with a view to show how necessary it is to do all that is possible, consistent with a reasonable economy, to diminish its amount.

Much attention has of late been given to this question.

For a great number of years the birth-rate has been declining, and there has been much speculation as to the cause of this phenomenon. The chief cause, doubtless, is the steady tendency to an advance in the ages of marriage, both of males and of females. It is probable, also, that the diminishing death-rate has had an effect in lowering the birth-rate. The excess of emigration over immigration has diminished, and, in the result, the rate of increase of the population in the 10 years preceding 1901 was greater than the rate in the previous 10 years, in spite of a lower rate of natural increase.

The pressure of growing population has probably caused a diminution in the birth-rate.

It is, however, precisely in the least prudent section of society that this influence would be least operative, and to this cause may, in part, be assigned our failure to show a diminution in the infant mortality.

It is, unfortunately, the case that, though the death-rate has steadily diminished in children generally, and amongst adults up to maturity, infants under one year of age have died at a somewhat higher rate than before.

The figures for England and Wales are as follows :—

Years	Deaths under 1 year per 1,000 born	Deaths per 1,000 born, less Diarrhœa and Cholera
1851–60	154	141
1861–70	154	137
1871–80	149	132
1881–90	142	128
1891–1900	153	135

We thus see that in the last decade we have reverted to the infantile mortality of 50 years ago, though we see also that this reversion is due to increase in the mortality from Diarrhœa. It is difficult to say, however, how far the increase from this cause is due to a change in the nomenclature causing an increase in the number of deaths assigned to this particular cause.

The infantile death-rates are available for the present City of Manchester since the year 1891, and here, also, in spite of much effort to instruct the poorer mothers in caring for their infants, it would seem at first sight as if we were going backwards. If we take the six years 1891–96, and the six years 1897–1902, we get the following figures :—

Six Years	Infantile Mortality	Infantile Mortality, less Diarrhœa
1891–96	184·6	160·8
1897–1902	189·0	150·7

In spite, therefore, of the great increase in Diarrhœal Mortality there are distinct signs of improvement, and it may only need favourable seasons to render this more conspicuous.

Take, for instance, the years 1894–98, 1899-1903, we get:

Five Years	Infantile Mortality	Infantile Mortality, less Diarrhœa
1894–98	183·6	154
1899-1903	182·4	149

By this slight alteration we seem to show a slight improvement as regards Diarrhœa, and a distinct improvement as regards other Diseases of Infancy.

We may infer that periods of five or six years are too short to show the changes occurring, and that periods of 10 years are certainly not too long.

This being made clear, we may compare the Infantile Mortalities of Manchester with those of other large centres for a period of 10 years.

The figures are as follows:—

Average Annual Number of Deaths, under 1 year, per 1,000 Births for a Number of Towns over the 10 years 1894–1903.

Years 1894–1903.

London	West Ham	Bristol	Birmingham	Leicester	Nottingham
153·9	164·3	143·5	183·1	178·1	184·8

Liverpool	Salford	Bradford	Leeds	Sheffield	Hull	Newcastle	Manchester
181·7	196·3	164·8	171·4	182·1	170·1	173·3	183·8

We thus see that there is a very excessive infantile mortality in Manchester, Salford, Liverpool, Birmingham, Nottingham, Leicester, and Sheffield, and a somewhat less excessive mortality in Newcastle, Hull, Leeds, Bradford, and West Ham. London and Bristol come out rather better.

But there is not one of these large centres in which the infantile death-rate is not excessive, and capable of being greatly reduced.

The total number of Manchester infants dying in the first year for the ten years 1894-1903 was 31,298, being over 27 per cent. of all the deaths registered during the same period.

The numbers are, therefore, sufficient to give great value to an analysis of the causes of death.

The percentages of the above 31,298 deaths assigned to different causes is as follows :—

The more common Infectious Diseases	6·61
Diarrhœal Diseases	17·46
Tuberculous affections	5·21
Lung Diseases	17·94
Atrophy, Marasmus, &c.	17·15
Premature Birth	10·51
Teething, Convulsions	6·58
Found dead in bed	3·19
Unclassified above	15·35

If we group together the different conditions due to the ingestion of insufficient, unsuitable, or contaminated foods, we perceive that under Diarrhœa, Convulsions, and Atrophy we get 40 per cent. of the total deaths. We may safely conclude that, at least, half of the deaths under one year are due to defective nutrition. Nor can it be doubted that the 3,355 deaths entered under "Premature Birth" are largely due to defective nutrition of the mother. It is probable, also, that no insignificant proportion of the unclassified deaths, and of those occurring under Tubercular Disease, is due in reality to malnutrition.

With a view to obtain a clear view of infantile mortality for the whole City, I have collected the number of deaths under 1 year per 1,000 born from a variety of causes for each of the ten years 1894 to 1903 for the whole City and for the four quarters.

These are exhibited in the following tables, in which the term "Wasting Diseases" is made to include premature births.

For the whole year we note the fluctuations which occur in the deaths from Measles and Whooping Cough from year to year.

Under "Diarrhœa," also, the mortality undergoes great variations, dependent chiefly on seasonal changes.

Under "Tubercular Disease" there is not much variation, but a marked tendency is exhibited towards a diminution in the mortality of recent years.

The same is true for "Convulsions." It is probable that both these causes of death are in reality closely allied to malnutrition, and should be grouped with Wasting Diseases.

Under "Lung Diseases" the variations are of very moderate extent, being smaller than one would expect. They do not ally themselves with any other group.

Nor can it be said that the other groups come into close relationship, except that "Wasting Diseases" appear to follow the same course as "Diarrhœa."

There is also a slight tendency for Tubercular Disease to show a similar accord, but it is not marked.

The deaths per 1,000 born under the heading "Found Dead in Bed" are not absolutely numerous. They are important, however, as indicating in a way the effects of intemperance. From this point of view the reduction under this cause in recent years is matter for satisfaction.

Turning, now, to the causes of death in quarters, we see first that by far the heaviest infantile mortality falls in the third quarter of the year. This is chiefly due to Diarrhœa. Nevertheless, were Diarrhœa mortality deducted from the total, the number of infantile deaths per 1,000 born would still be greater in the third and fourth quarters than in the first and second.

Measles and Whooping Cough are most fatal in the second quarters, and Whooping Cough is more fatal to infants than Measles.

Diarrhœa exacts a terrible mortality in Manchester in the third quarter of the year. It is more fatal in the fourth than in the second, and in the second than in the first quarter.

It is notable that deaths from Wasting Disease are most numerous in the third quarter, then in the fourth They are, however, more numerous in the first than in the second quarter.

The same order holds for Tubercular Disease as for Wasting Diseases. The number of deaths from Convulsions again follows the same order as the numbers from Diarrhœa. On reference to the section relating to Diarrhœa, it will be seen that malnutrition plays a powerful part in the production of the fatal forms of that disease.

But Diarrhœa also reacts on Wasting Diseases by the lasting injury which it often inflicts on the digestive organs, and the high mortality from Wasting Diseases in the fourth quarter of the year is doubtless due largely to the effects left by attacks of Diarrhœa.

As regards Tubercular Disease, the deaths included under this heading are doubtless in part really due to Tuberculosis, but are largely also the effects of other conditions causing malnutrition.

It is thus to be expected that these causes of death would be linked together in the manner which we perceive them to be.

It is, in fact, manifest that the mortality of infancy is due, mainly, to malnutrition.

The mortality from Lung Diseases in infancy is highest in the fourth quarter of the year, lowest in the second and third. The fogs of November and the early chills of winter are, in fact, fatal to the young as to the old.

But Diseases of the Lung are not due merely to chill and fog. They are largely produced by the dust of dirty homes, and by the refuse floating in the air behind dwellings.

The further determination of the conditions which have produced the malnutrition evidenced by the analysis of infantile mortality depends on the investigation of individual cases.

From such investigations, and from the enquiry made last year into fatal cases of Diarrhœa, there is abundant evidence that much ignorance exists as to the food which infants ought to receive, and as to the details of management needed to keep them in good health.

There is, also, unfortunately, a certain amount—not, I believe, a large amount—of wilful negligence. Illegitimate infants form 4 per cent. of the total, and their death-rate is double that of legitimate infants. It is, largely, towards these that the cruelties of baby farming are practised.

In regard to legitimate infants, drunkenness is chiefly responsible for the cruelties under which they suffer.

The chief reason for the excessive death-rate of illegitimate children probably is that they cannot, from the circumstances of their birth, have the mother's breast, and so undergo the excessive fatality incidental to all artificial feeding.

Table showing the Number of Deaths in proportion to 1,000 Children Born in each of the Ten Years 1894–1903 under a number of Headings.

Whole Year.

Causes of Death	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	Average for the ten years
All Causes	158·54	202·43	176·13	194·62	195·87	205·42	188·74	198·46	151·44	168·54	184·02
Measles	2·71	5·51	7·75	8·05	2·69	8·82	3·42	4·46	3·47	5·07	5·20
Whooping Cough	6·50	5·28	7·63	6·69	3·77	4·84	9·22	5·29	6·56	5·58	6·14
Other Common Infectious Diseases	1·57	1·76	0·68	0·57	0·69	0·28	0·63	0·89	0·66	0·68	0·84
Diarrhœa	13·61	34·68	24·14	38·52	45·46	47·79	35·64	47·54	12·95	22·14	32·25
Tubercular Diseases	11·02	12·03	8·93	11·17	9·55	10·07	8·43	8·92	7·38	8·31	9·58
Convulsions	13·85	11·86	10·52	10·04	9·84	8·59	8·77	10·52	7·71	9·16	10·09
Other Nervous Diseases	4·28	5·22	4·98	5·05	4·23	3·93	3·59	4·01	3·42	3·13	4·18
Lung Diseases (not Phthisis)	32·88	35·37	32·79	33·07	32·31	34·48	35·01	30·27	32·83	30·62	32·96
Wasting Diseases	41·00	54·89	48·06	51·05	55·02	56·22	51·47	53·41	46·11	51·45	50·87
Found Dead in Bed, etc.	6·20	6·64	6·22	5·56	6·07	6·60	5·98	5·29	5·12	4·95	5·86

TABLE SHOWING UNDER VARIOUS HEADINGS THE NUMBER OF DEATHS IN PROPORTION TO 1,000 CHILDREN BORN IN THE FIRST QUARTER OF THE TEN YEARS 1894–1903.

Causes of Death—I.	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	Average
All Causes	167·78	165·10	157·23	154·10	140·07	166·93	156·33	152·56	132·35	162·44	153·49
Measles	2·14	3·76	7·69	2·40	1·57	9·60	4·09	1·43	2·75	9·42	4·49
Whooping Cough	10·22	5·01	8·85	7·21	3·82	2·97	0·91	5·96	5·71	6·96	5·36
Other Common Infectious Diseases	0·95	1·67	0·93	0·22	0·45	0·23	1·08	0·72	0·42	0·45	0·71
Diarrhœa	5·47	5·84	6·52	8·09	8·75	5·95	5·81	6·91	4·86	9·20	6·74
Tubercular Diseases	10·46	9·60	7·22	10·49	6·96	10·05	6·46	6·67	5·92	7·85	7·97
Convulsions	17·59	13·15	10·95	9·84	10·55	7·32	8·61	9·54	8·03	7·63	9·51
Other Nervous Diseases	5·47	3·55	4·66	5·46	2·92	3·43	3·45	2·38	2·96	3·14	3·74
Lung Diseases (not Phthisis)	37·07	35·27	32·84	29·51	29·18	40·70	36·39	31·70	26·22	29·84	32·87
Wasting Diseases	43·73	47·38	43·09	45·25	48·26	53·51	47·37	50·30	44·40	51·83	47·51
Found Dead in Bed	9·27	9·18	5·36	8·09	4·71	5·95	7·97	5·72	6·55	5·61	6·84

Second Quarter otherwise same as First Quarter.

Causes of Death—II.	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	Average
All Causes	127·79	170·66	156·05	156·71	145·23	151·75	162·73	132·62	138·33	145·52	148·74
Measles	3·06	8·52	13·67	12·35	2·66	16·26	4·63	5·34	3·14	4·67	7·43
Whooping Cough	7·53	9·44	10·14	11·44	5·10	8·89	16·54	7·11	7·64	9·78	9·36
Other Common Infectious Diseases	0·71	0·69	0·22	0·23	0·67	0·00	0·88	1·52	0·45	0·67	c·60
Diarrhœa	0·59	7·37	11·46	8·92	9·09	6·94	11·47	5·08	5·17	7·55	8·36
Tubercular Diseases	9·65	9·67	7·71	7·09	8·65	5·64	5·29	5·84	6·29	7·55	7·34
Convulsions	11·53	11·05	9·70	9·61	10·20	9·10	8·16	11·69	6·51	11·33	9·89
Other Nervous Diseases	2·12	6·68	4·41	5·03	3·33	4·34	3·09	3·05	4·04	2·89	3·90
Lung Diseases (not Phthisis)	27·07	40·99	29·76	31·11	25·72	25·80	35·06	20·07	29·42	25·77	29·08
Wasting Diseases	32·48	44·45	41·88	46·90	48·34	47·04	48·29	44·46	44·69	47·77	45·63
Found Dead in Bed	3·29	6·68	6·39	3·20	5·10	8·42	5·73	3·30	6·06	4·67	5·24

Third Quarter.

Causes of Death—III.	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	Average
All Causes	177·55	276·36	231·26	304·07	300·14	346·54	245·03	349·22	155·12	184·36	256·97
Measles	4·10	5·55	5·69	12·45	2·57	6·60	3·12	4·28	2·21	3·80	5·04
Whooping Cough	5·30	3·24	6·88	6·45	3·51	5·24	6·69	5·14	7·30	2·46	5·22
Other Common Infectious Diseases	1·45	1·62	0·47	0·67	0·70	0·46	0·22	0·86	0·89	0·67	0·80
Diarrhœa	33·25	93·89	70·68	124·03	139·08	165·30	95·96	185·16	21·69	51·84	98·09
Tubercular Diseases	13·01	15·96	13·28	16·23	14·26	15·94	11·83	17·69	0·42	11·40	13·00
Convulsions	14·70	14·34	10·67	10·00	8·65	8·42	9·15	8·84	7·97	8·27	10·10
Other Nervous Diseases	4·82	6·71	6·17	6·67	7·48	5·92	4·69	8·27	3·32	3·35	5·94
Lung Diseases (not Phthisis)	26·50	26·83	26·33	31·34	26·41	34·84	23·43	24·25	32·75	25·47	27·82
Wasting Diseases	44·09	70·77	59·06	65·13	63·11	68·31	59·36	63·05	45·59	47·15	58·56
Found Dead in Bed	4·82	3·01	3·32	3·78	2·81	5·01	2·90	3·14	3·10	2·91	3·48

Fourth Quarter.

Causes of Death—IV.	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	Average
All Causes	162·00	201·59	160·21	158·09	203·21	156·82	192·11	179·04	180·67	181·86	177·56
Measles	1·50	4·32	3·81	4·93	4·01	2·14	1·54	6·91	5·84	1·93	3·69
Whooping Cough	2·75	3·36	4·66	1·41	2·60	1·91	2·82	2·96	5·62	2·90	3·10
Other Common Infectious Diseases	3·25	3·12	1·06	1·17	0·94	0·48	0·26	0·49	0·90	0·97	1·26
Diarrhœa	9·25	34·84	10·37	10·57	28·09	11·20	29·97	11·84	20·45	19·83	18·64
Tubercular Diseases	11·00	13·21	7·62	10·57	8·50	8·82	10·50	6·66	11·01	6·05	9·39
Convulsions	11·50	8·65	10·58	10·34	9·68	9·53	9·22	12·33	8·31	9·43	9·96
Other Nervous Diseases	4·75	3·84	4·23	2·82	3·30	1·91	3·07	3·21	3·37	3·14	3·36
Lung Diseases (not Phthisis)	41·25	38·68	40·85	39·93	48·62	37·18	46·62	43·90	43·37	41·84	42·22
Wasting Diseases	44·00	57·90	47·83	45·57	61·13	56·48	50·46	56·72	49·66	59·01	54·87
Found Dead in Bed	5·00	6·97	7·41	6·81	10·62	6·91	6·40	8·14	3·15	5·80	6·72

Before endeavouring to reduce the high rate of infantile mortality, we may, not without profit, consider whether we do well to bestow our efforts in this direction. We have seen that, in spite of the high death-rate, the rate of natural increase is by no means low. If these children are doomed to a life of weakness and suffering, they cannot perish with less suffering than they do. Is it an advantage that they should be saved and reared? They are, on the whole, the least useful part of the nation, feeble at the outset, or inheritors of the qualities which are destroying them.

These are by no means immaterial considerations, and it is no answer to say that it is the duty of the Medical Profession and of the Public Health Service to save life, apart from any other consideration.

In the first place, however, by no means all the children lost are feeblings, or are sacrificed to neglect. But a far more important consideration is this: that judicious efforts directed to the saving of life also prevent disease and disablement in the survivors, who belong, on the average, to a better stock.

For every case dealt with by the Society for the Prevention of Cruelty to Children there are many others in which the parents are stimulated to increased care for their children's welfare.

In the same way, for every child saved by judicious instruction in the management of infants from fatal illness there are several whose health is placed on an entirely different level from what it would otherwise have occupied.

At present the agencies chiefly concerned in the direct protection of infants may be said to be these :—

1. The Society for the Prevention of Cruelty to Children. It is chiefly with the grosser cases of neglect that the Society deals. The principal influence causing parents to come within the sphere of its operations is drunkenness.

From the Annual Report of the Society for 1902–03 we learn that 1801 cases were dealt with in that year. From the Report for 1903-04 we find that 1,711 cases were dealt with, of which 1,607 were of neglect, 76 of ill-treatment. In 117 instances legal proceedings were taken.

The Reports show that in some instances, at all events, the severe measures taken have led to the re-establishment of well-ordered homes.

2. Work done under the Infant Life Protection Act, 1897. Miss Zanetti's excellent Report for 1904 continues to show that a substantial protection is afforded to infants put out to nurse, so far as they come under the Act. She

also emphasises, however, the modes in which the Act is evaded, and the necessity for bringing within its scope "one child" cases. Mrs. Bostock's Report to the Manchester Board of Guardians also calls attention to this need.

3. Directions for the management and feeding of infants, particularly of those not receiving the breast, are furnished by the Public Health Department to the Registrars of Births and Deaths, by whom they are supplied to mothers when the birth is registered.

4. Under the Midwives Act, 1902, it is expected that we shall be able to influence the care bestowed on infants, at an earlier age, through the midwives. In cases attended by medical men, the medical attendant would generally find time to give instructions to the mother in the management of the infant.

It is also hoped that medical men will assist the Midwives Supervising Committee, in so far as they have to deal with midwives, by influencing them to give increased attention to the management of infants.

5. It is, however, through the house-to-house visitation by the Visitors of the Ladies' Public Health Society, and through the instructions given by them in infant feeding, and in other matters pertaining to infants, that we must expect the greatest influence to be exerted.

During the last year we have been endeavouring to give a more practical turn to their instructions, and the Health Visitors have been trained to show mothers, by actual demonstrations, what precautions are necessary.

Here we are limited in several directions. The amount paid to the Health Visitors is not sufficient to ensure a general high average of intelligence. They are not acting under the authority of the Corporation. If, in spite of these drawbacks, much useful work has been done, this is owing to the quality of some of the Health Visitors, and to the stimulus of the Society, rather than to the satisfactory character of the general position.

It would be a great additional security if a trained and educated lady, holding a sanitary inspector's qualification, were appointed to give continuity to the work.

The visits made on behalf of the Ladies' Public Health Society cover only the central portions of the City, and it is, therefore, desirable to see whether infants suffer to a much greater extent in the districts covered by the work of the Society than they do in other districts.

The facts of infantile mortality are exhibited for each Sanitary District in the following table. (See table.)

Table showing for each Sanitary District the Number of Deaths of Infants under One Year per 1000 born for each of the Years 1894 to 1903, also the Number of Deaths per 10000 born in the Ten Years.

	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1894 to 1903
City of Manchester ...	**159**	**202**	**176**	**195**	**196**	**205**	**189**	**198**	**151**	**169**	**1840**
Manchester Township ...	187	224	207	222	218	243	225	236	168	195	2125
North Manchester	128	176	146	167	164	172	160	172	139	140	1564
South Manchester	157	203	173	193	201	204	186	196	150	174	1837
Ancoats	200	216	203	228	208	240	213	234	178	194	2114
Central	211	241	216	259	253	239	244	255	139	207	2264
St. George's	166	223	205	201	211	246	226	231	173	190	2072
Cheetham	92	151	108	129	122	104	114	124	97	111	1152
Crumpsall	90	200	172	105	143	168	150	139	104	88	1269
Blackley	108	126	121	146	123	155	167	133	119	129	1327
Harpurhey	95	215	188	185	173	196	164	148	147	106	1617
Moston	94	80	105	149	180	149	118	141	138	137	1291
Newton Heath	153	169	145	193	173	196	167	196	151	161	1704
Bradford....................	160	226	189	180	212	225	209	200	165	184	1950
Beswick	141	168	127	162	154	169	181	203	167	131	1603
Clayton	163	217	159	269	185	224	182	304	173	189	2065
Ardwick	164	193	158	191	205	215	186	188	158	172	1830
Openshaw	154	221	182	189	220	216	190	211	159	186	1928
West Gorton	160	209	159	184	217	216	191	190	148	177	1851
Rusholme and Kirkmanshulme ...	145	182	144	147	179	145	127	148	120	119	1456
Chorlton-on-Medlock ...	134	171	180	173	198	215	190	184	138	183	1766
Hulme	171	223	186	223	197	196	199	222	160	180	1957

On reference to the table, it will be seen that there are some districts in which work similar to that carried on by the Health Visitors would be specially beneficial.

These are: in North Manchester, Clayton and Bradford; in South Manchester, Openshaw, West Gorton, and Ardwick.

At the same time, as has already been stated, the extension of this work should, in my opinion, be through officers appointed by the Corporation, and supervised by a trained lady acting under the instruction of the Medical Officer of Health.

Although, however, the work done at present is certainly useful, it is to a thorough training of girls and young women in the principles of domestic hygiene, practically taught, more than to any other agency that we must look for further improvement, and it is greatly to be desired that a suitable scheme for such teaching should be devised and enforced.

PHTHISIS.

I beg to submit a report on the Voluntary Notification of Phthisis during the year 1904.

The various tables in this section have been prepared by Mr. Lock.

In this period the total number of new cases notified to the Medical Officer of Health was 1,202. Of these, 250 were notified by private practitioners—this being one less than in 1903. The total number notified from all sources is, however, smaller this year than last; so that the number of patients notified by private practitioners represents a greater fraction of the total number of cases than it did last year.

The following tables show:—

(1) The number of cases notified by the

- (*a*) Poor-law Medical Officers,
- (*b*) From Institutions, and
- (*c*) By Private Practitioners;

(2) The particulars of cases notified from Institutions;

(3) The disinfection done, the samples of sputum examined with their results, the number of deaths occurring amongst cases visited and registered compared with the total number of deaths from Phthisis, &c.

NUMBER OF CASES NOTIFIED.

Year	Poor-law Cases	Institutions	Private Practitioners	Total
1900	587	446	540	1573
1901	625	373	341	1339
1902	667	305	303	1275
1903	556	550	251	1357
1904	505	447	250	1202
Total	2940	2121	1685	6746

PARTICULARS OF CASES NOTIFIED FROM INSTITUTIONS.

Institutions	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Manchester Union Workhouse	79	71	62	101	313
Chorlton Union Workhouse	56	31	37	40	164
Prestwich Union Workhouse............	3	1	6	4	14
Poor-law Union Cases	5	...	5	3	13
Consumption Hospital	83	85	77	68	313
Ancoats Hospital	16	11	9	6	42
Chorlton-upon-Medlock Dispensary ...	7	3	2	4	16
Hulme Dispensary	9	5	3	5	22
Gartside Street Dispensary	3	2	4	...	9
Royal Infirmary	...	4	1	...	5
Medical Mission, Red Bank	2	6	...	4	12
Northern Hospital	...	...	...	...	...
St. Mary's Hospital	...	...	...	...	...
Southern Hospital	...	...	...	...	...
Children's Hospital, Pendlebury	...	...	...	...	...
H.M. Prison	28	1	...	...	29
Total	291	220	206	235	952
Private Practitioners	76	72	47	55	250

Statistics Relating to Phthisis.

	1904	1903	1902	1901	1900	1899 Sept. 1 to Dec. 31	Totals
Cases Visited and Registered—							
Males	745	848	917	959	786	231	4486
Females	471	515	532	546	538	194	2796
Totals	1216	1363	1449	1505	1324	425	7282
Houses Disinfected—							
1. By Corporation—							
(*a*) With solution of chlorinated lime only	449	484	601	792	581	No Record	2907
(*b*) With lime solution only	0	0	2	15	109		126
(*c*) By Esmarch's method and solution of chlorinated lime	788	643	359	144	0		1934
Totals	1237 (in 1084 houses)	1127	962	951	690	...	4967
2. By Tenants—							
Esmarch's method.........	2266 (in 1404 houses)	2118	1937	1776	1299	No Record	9396
Totals	3503	3245	2899	2727	1989	...	14363
Specimens of Sputum Examined:							
Positive.........................	242	239	248	232	104	...	1065
Negative	418	389	337	285	154	...	1583
Totals	660	628	585	517	258	...	2648
Deaths—							
(*a*) Among total cases visited and registered	661	578	652	638	560	93	3182
(*b*) Among all cases for Manchester (including those under *a*)	...	1023	1145	1142	1133	270	...
Cases reported as sent to Hospital	1207	1159	1166	1012	851	140	5535
Notified from common lodging-houses	188	206	239	254	146	41	1074

In connection with the disinfection of houses, 2,150 special cases were entered in the business book. This work includes letters to owners, tenants, health visitors, etc., the making out of forms 1, 2, and 3, receiving reports, giving instructions, checking costs, endorsing forms,

The following table shows the cases notified in the various districts during the year 1904 and also the numbers of deaths from Phthisis in the same districts :—

	Cases Notified					Deaths				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total
City of Manchester	**367**	**292**	**253**	**290**	**1202**	**302**	**271**	**237**	**296**	**1106**
I. Manchester Township	133	121	101	131	486	103	101	92	117	413
II. North Manchester	68	56	43	42	209	60	52	44	62	218
III. South Manchester	166	115	109	117	507	139	118	101	117	475
I. Ancoats	38	37	26	35	136	26	28	20	26	100
I. Central	40	31	27	32	130	23	29	30	40	122
I. St. George's	55	53	48	64	220	54	44	42	51	191
II. Cheetham	14	21	13	19	67	12	9	10	13	44
II. Crumpsall	2	...	2	...	4	1	...	2	2	5
II. Blackley	3	1	2	2	8	6	7	5	3	21
II. Harpurhey	8	6	5	3	22	9	9	6	5	29
II. Moston	2	5	...	2	9	5	6	...	3	14
II. Newton	13	12	10	7	42	7	9	13	16	45
II. Bradford	15	4	4	4	27	12	5	3	11	31
II. Beswick	7	3	5	3	18	6	3	4	6	19
II. Clayton	4	4	2	2	12	2	4	1	3	10
III. Ardwick	29	14	18	15	76	20	22	17	18	77
III. Openshaw	10	7	4	5	26	12	7	10	9	38
III. West Gorton	17	16	14	8	55	7	16	10	14	47
III. Rusholme and Kirkmanshulme	5	7	12	6	30	11	4	6	5	26
III. Chorlton-upon-Medlock	49	36	29	35	149	46	32	31	32	141
III. Hulme	56	35	32	40	163	43	37	27	39	146
III. Moss Side	...	...	...	8	8	...	...	...	...	...

Card Indexes.

(1) In the Street and House Card Index we have approximately 17,500 cards, representing houses which have been infected or in which consumptives have lived

(2) A card index has been made containing the names of all notified cases still living.

(3) A card index has also been made containing the names of all persons who have died from Phthisis during and since 1898.

It is to be noted that the number of cases notified is greater than the number of deaths. If one takes three years as the average duration of life after the onset of Phthisis, then one would expect that after a scheme of notification had been existent for a few years the number of new cases arising would approximate more and more closely to the number of deaths. If all cases were notified (which is not so, seeing that of all deaths occurring from Phthisis in Manchester only a little more than half that number occur amongst notified cases), then, over a number of years, the number by which the notifications of new cases exceeded the number of deaths from Phthisis would represent—

(1) The number cured, and the number mistakenly diagnosed as Phthisis;

(2) The number notified who had left Manchester before death;

(3) The number of Phthisis patients who were certified as dying from some other disease.

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(1) The number cured *after notification* is small, and the great proportion of these cures occur amongst children.

(2) The number notified who had left Manchester before death. In Manchester, cases amongst the tramp class are notified; these, after a short stay, leave the City, and many die in other parts. This happens to a less extent with the cases from common lodging-houses, and still less from private houses. The following table shows in the first line the numbers of cases notified from private houses, common lodging-houses, and the tramp wards

during 1901. The second line shows the number of those whose deaths have been recorded in Manchester since that date. The third line gives the numbers of deaths in percentages :—

	Private Houses	Common Lodging-houses	Tramp Wards
Cases registered during 1901	1,042	254	43
Number of deaths occurring amongst those cases to date..............	715	81	2
Percentages	67·6	31·9	4·7

Although all that is obtained from such a table is an indication, still a rough index is probably provided of the proportionate amount of migration occurring in these different classes.

(3) Some cases of Phthisis are notified as dying from Bronchitis. In some cases of Phthisis it is very difficult to diagnose the exact condition in the last stages of the illness. A greater number of specimens of sputum are taken in each succeeding year, and this probably leads to a definite diagnosis of Phthisis being arrived at in cases which in absence of a test would have been certified as Bronchitis.

Infection.

Given a patient suffering from Phthisis, the discharge from the infected area in the lungs may contain myriads of tubercle bacilli. When the patient coughs, he coughs up infective material, and he also divides part of this material into a fine spray. Not only in the act of coughing, but also in sneezing, and in loud talking, a fine spray is produced. In the last two acts, however, the spray consists chiefly of saliva, and, seeing that this is infected secondarily, the tubercle bacilli are probably present in much fewer numbers. During silence and quiet talking (according to recent experiments by M. Gordon) saliva is seemingly not disseminated into the air.

A fine spray being present, the particles will at once begin to fall towards the ground. The larger particles will fall rapidly—the smaller will fall very slowly, and will be carried considerable distances by air currents.

(1) *The larger particles of spray.* One may take it from recent experiments that the larger particles of the spray do not pass further than one metre (about $39\frac{1}{3}''$) from the patient. The healthy individual is comparatively safe at that distance, although a Phthisis patient is coughing, provided there are no strong air currents towards him and that he is on the same, or a higher, level than the patient. Infection from the larger particles of spray directly is most likely to occur when a Phthisis patient sleeps with a healthy individual; it may also occur in places where people cannot easily alter their relative positions—in public meeting places and crowded railway carriages.

It follows :—

(1) That a Phthisis patient should have a bed to himself;

(2) That he should be taught to cover his mouth with a rag while coughing, so that the larger particles of spray may be arrested at once.

In the table giving the sources of infection, it will be found that a considerable percentage of cases are traced to members of the same family.

(2) *The finer particles of spray* take much longer to fall to the ground, and are also easily moved by air currents. They may be carried, therefore, to any part of a large room. It is, however, in the air of the small, badly-ventilated room that these are likely to be present in relatively great numbers. If tubercle bacilli are carried in these finer particles in a similar manner to the bacillus prodigiosus, then these particles of spray may lead to infection.

The Phthisis patient who coughs much should have a bedroom to himself if possible, but failing this the room should be well ventilated, with the bed of the patient nearer the air outlet. A gauze cover suspended mosquito-net-wise over the patient would catch a great many of the spray particles.

(3) *The sputum and the spray which falls to the ground.* As has been so frequently repeated, the sputum is dried, mixed with dust, and on disturbance again rises into the air.

The Phthisis patient is asked to spit into a special bottle (163 spit bottles were supplied gratis to notified cases during the year), or an impermeable cardboard box, or Japanese tissue paper, all provided for him free of charge. Some patients use rags. All are warned against using handkerchiefs or any article which cannot be burned or easily cleansed.

Even if all cases of Phthisis known to the medical profession were careful regarding their spit, there would remain a considerable percentage who were overlooked or who had not consulted a doctor. Legal powers have, therefore, been obtained to prevent people spitting on the floor, side or wall of any public carriage or of any public hall, public waiting-room or place of public entertainment, whether admission thereto be obtained upon payment or not, under a penalty not exceeding £5.

1690 notices to this effect have been issued to all places registered for dancing or music, to the railway companies, to the free libraries, etc.

3412 cardboard notices have been issued to warehouses and workshops during 1904.

The following notice (15″ by 11″) is an example of a recently issued appeal specially prepared for offices :—

NOTICE AS TO SPITTING.

Do not Spit on the Floors or Walls.

This unpleasant habit causes the spread of

CONSUMPTION

and other Infectious Diseases.

MEDICAL OFFICER OF HEALTH.

The following letter was issued during 1904, and has been sent to all public houses, excepting those registered for music and dancing, and to all warehouses at which notified cases have been employed :—

Public Health Office,
Town Hall, Manchester.

DEAR SIR,—I desire to draw your attention to the great danger incurred through the depositing of expectoration by persons suffering from Consumption on the floors and walls of rooms and other confined places frequented by them, or in which they are employed, and especially of the closets used by them; and to the urgent importance of preventing, as far as possible, the continuance of this objectionable and injurious habit

The necessity for precaution in this matter is particularly applicable in your case, seeing that during the course of years a number of such persons are known to have been in your employ, and others presumably consumptive have frequented your premises. Even where this is not

known to have been the case, it is impossible to tell whether people who suffer from cough and spit are consumptive or not, and precautions should be adopted, and where already adopted should not be relaxed.

I should be glad if you would aid me in checking the spread of this disease by prohibiting spitting, except into suitable receptacles, in your workrooms and closets.

If you have not already a sufficient supply of notices for display upon your walls, I shall be pleased to provide you with any reasonable number.

Yours faithfully,

MEDICAL OFFICER OF HEALTH.

The sooner dried sputum is mixed with dust and is floating in the air, the more likely are any contained tubercle baccilli to be virulent.

Great danger is run from dust containing recent spit

(1) in the public-house,

(2) in the common rooms of common lodging-houses,

(3) in the railway carriage smoking compartment.

In these positions one constantly finds spit upon the floors. In the first two, spittoons are usually provided, but are not used by all the frequenters.

In summer flies are seen in great numbers in the spittoons feeding upon the spit. The carriage of tubercle bacilli to articles of food on the body of the fly provides a possible, although one is inclined to believe a rare, source of infection. Such spittoons should not be filled with sawdust or other dry material; but their contents should be moistened with some powerful disinfectant, or should be fluid.

During 1904, in 284 instances the public-house and in 106 instances the common lodging-house were probable or possible sources of infection.

In the railway carriage nothing is provided, and the majority of smokers do not seem to recognise the danger which they run.

When one considers how well known are the irritating qualities of dust, and also its possible infectious character, one is surprised that dry dusting and sweeping are still almost universal. It will be found in the table of principal occupations of the patients that a great number are charwomen

The sources of infection, so far as it has been possible to ascertain them, are given in the following tables :—

CASES OTHER THAN THOSE NOTIFIED FROM THE WORKHOUSES.

Most Probable Source of Infection	Likely	Less Likely	Possible	Total
Father	29	14	...	43
Mother	13	12	1	26
Brother	24	15	1	40
Sister	25	10	2	37
Husband	8	4	1	13
Wife	6	6	...	12
Uncle...	6	1	...	7
Aunt	3	3	...	6
Son	4	4	...	8
Daughter	2	4	...	6
Grandfather	1	1	...	2
Grandmother	1	...	...	1
Nephew	1	...	...	1
Niece	1	...	...	1
Father-in-law	1	1	...	2
Brother-in-law	7	2	...	9
Sister-in-law	3	2	...	5
Cousin	1	6	1	8
Relatives	2	3	...	5
Companion	22	3	...	25
Schoolfellow	...	6	3	9
Neighbour	9	9	1	19
Tenant (Landlady, &c.)	3	1	...	4
Lodger	4	4	...	8
Fiancé or Fiancée	3	...	...	3
Sister's Fiancé	...	1	...	1
Child nursed	1	...	...	1
Patients in Hospital, &c.	1	1	...	2
Employer	1	1	...	2
Workfellow	33	58	10	101
Workplace or Work	9	25	5	39
Houses (including public-houses, &c.)	28	46	...	74
Milk	2	1	1	4
Club	1	...	...	1
Clothing	...	1	...	1
Re-infected	...	...	...	1
Army	3	3	...	6
Infected outside Manchester	...	...	...	12
No information	...	...	...	56
Cases with Multiple Sources included in the above	...	...	...	150
Total	258	248	26	601*

* The 150 cases with multiple sources are not included in this total.

Cases notified from the Workhouses.

Source of Infection	Likely	Less Likely	Possible	Total
Father	5	7	2	14
Mother	3	6	...	9
Brother	6	10	...	16
Sister	8	2	...	10
Husband	4	9	1	14
Wife	6	4	3	13
Uncle	1	1	...	2
Aunt	3	1	...	4
Son	4	...	...	4
Daughter	4	3	...	7
Step-brother	...	1	...	1
Niece	...	1	...	1
Father-in-law	1	...	...	1
Mother-in-law	...	2	...	2
Son-in-law	1	...	...	1
Brother-in-law	1	...	...	1
Cousin	...	...	1	1
Companion	10	5	1	16
Schoolfellow	...	3	...	3
Neighbour	3	2	2	7
Tenant (Landlady, &c.)	2	5	3	10
Lodger and Fellow-lodger	6	6	...	12
Employer	1	...	...	1
Workfellow	13	29	3	45
Workplace or Work	1	42	2	45
Houses (including P.H's., C.L.H's.)	57	107	3	167
Army	6	2	...	8
Milk	...	...	1	1
Asylum	...	1	...	1
Outside Manchester	...	...	...	11
No information	...	...	...	71
Multiple Sources included in the above	...	...	...	157
Total	146	249	22	499†

† The 157 cases with multiple sources are not included in this total.

A table relating to the personal habits of the patients, chiefly as regards intoxicants, has also been made out, and is given below:—

PHTHISIS, 1904.

Personal Habits—Males.

Year	0—14		15—24		25—44		45—64		65 & upwards	
	+	−	+	−	+	−	+	−	+	−
1902	16	1	73	17	138	189	58	171	4	19
1903	45	2	105	14	162	182	77	108	2	11
1904	26	1	86	15	162	168	76	114	7	7

Personal Habits—Females.

Year	0—14		15—24		25—44		45—64		65 & upwards	
	+	—	+	—	+	—	+	—	+	—
1902	18	0	97	1	157	59	43	27	5	1
1903	61	0	120	6	167	40	46	18	2	0
1904	39	3	94	5	161	40	53	11	4	1

The sign + stands for good personal habits ; the sign — for bad.

The principal occupations of the patients at the time of infection are given. This subject has been very fully discussed in previous annual reports :—

PHTHISIS, 1904.

Principal Occupations—Females.

Occupation	General	Crumpsall	Withington	Total
Cotton Manufacture	23	3	1	27
Charwomen	16	15	11	42
Do. at Public-houses	1	4	1	6
Domestic Servants	14	1	3	18
Fancy Box Makers	5	...	...	5
Housework	98	22	14	134
Hawkers	...	3	3	6
Laundresses	1	3	2	6
Machinists	39	4	8	51
Milliners and Dressmakers	4	1	1	6
Printing Trade	2	...	...	2
Rubber Workers	3	...	1	4
Rag Sorters, &c.	1	3	...	4
Scholars	34	2	3	39
Smallware Manufacture	4	1	...	5
Tobacco Workers	3	...	...	3
Tailoresses and Mantle Makers	8	...	...	8
Waitresses at Public-houses	5	...	3	8
Total	261	62	51	374

PHTHISIS, 1904.

Principal Occupations—Males.

Occupation	General	Crumpsall	Withington	Total
Barmen	10	1	1	12
Bakers	...	4	3	7
Brass and Copper Workers	8	1	1	10
Building Trade	11	13	4	28
Carters	13	3	5	21
Commercial Travellers	7	1	2	10
Cotton Manufacture	2	...	...	2
Clerks	25	2	1	28
Coach Drivers and Cleaners	...	...	3	3
Dock Labourers	1	6	3	10
Dyers	7	1	2	10
French Polishers	4	...	3	7
Gaswork Employees	...	...	...	...
Glass Workers	2	3	...	5
General Labourers	19	28	20	67
Hawkers	6	20	6	32
Housepainters	3	6	2	11
Hairdressers	1	1	2	4
Ironworkers	40	25	8	73
Leather Trade	3	...	1	4
Labourers at Chemical Works	2	5	...	7
Market Porters	...	24	...	24
Printers	5	...	2	7
Plumbers	3	...	3	6
Pork Butchers	...	...	...	...
Rubber Workers	7	1	3	11
Railway Employees	9	5	1	15
Scholars	25	...	4	29
Soldiers	6	5	6	17
Shoemakers	6	8	2	16
Tailors	8	2	1	11
Warehousemen (excluding Porters)	27	5	5	37
Warehouse Porters	...	14	4	18
Woodworkers	15	8	5	28
Total	275	192	103	570

Duncan Forbes, M.D.

BACTERIOLOGICAL SUMMARY.

The following is a summary of the bacteriological work done for the Public Health Office during 1904:— Diphtheria

STATEMENT OF BACTERIOLOGICAL EXAMINATIONS IN CONNECTION WITH CASES OF DIPHTHERIA.

Total number of examinations made	Specimens collected outside Monsall Hospital.					Specimens		
	Positive	Negative—Medical Attendant adhered to his diagnosis	Negative—Medical Attendant accepted the diagnosis	Duplicate and control specimens		Positive	Negative—Diagnosed Diphtheria	Negative—Diagnosed as other diseases
				Positive	Negative			
1221	268	52 *	430	16	55	76	17 *	62

Collected at Monsall Hospital.							
Duplicate and control specimens		Post scarlatinal		Monsall Staff		Specimens from diphtheritic throats considered not diphtheria	
Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
18	30	13	7	6	10	39	122

* Two and six respectively were cases of Membranous Croup.

It will be seen that out of 750 specimens taken outside the Hospital the medical attendant adhered to his diagnosis in spite of a negative result in 6·9 per cent. In the case of the Hospital specimens the disagreements reached 11 per cent.

Enteric Fever

The following is a Tabulated Statement of the result of the Bacteriological Examinations made by Professor Delépine of specimens of blood taken from suspected cases of Enteric Fever :—

Number of cases submitted to examination	Collected outside Monsall Hospital.					Collected Inside Monsall Hospital.								
	Positive re-action	Negative adheres	Negative accepts	Duplicate and control specimens		Positive re-action	Negative adheres	Negative accepts	Duplicate and control specimens		Cases from outside districts		Staff	
				Positive	Negative				Positive	Negative	Positive	Negative	Positive	Negative
660	244	28	260	7	47	34	7	9	4	16	...	...	2	2

In the case of samples taken outside the Hospital, the disagreements amount to 5·3 per cent. of the total.

Examination of Sputum in connection with the Voluntary Notification of Phthisis, 1904.

Examinations of Sputum for tubercle bacilli

Six hundred and sixty specimens of sputum were submitted for examination with the following results :—

Positive	242
Negative	418
	660

Many of these involved considerable trouble. It may be confidently said that those giving a positive result indicated the presence of tuberculosis ; while the negative results do not necessarily exclude the disease.

The following samples were submitted in connection with the Manchester Milk Clauses :— Examinations of milk for tubercle bacilli

	Number of specimens mixed milk taken at the station	Number of specimens mixed milk elsewhere	Number of each found to contain tubercular infection	Number of farms visited in consequence	Number of specimens taken from individual cows as results of following up station samples	Number of milks from individual cows proved to be tuberculous out of those given in the preceding column	Number of udders proved to contain tuberculous lesions	Number of milks taken from individual cows as the result of *notification* or *otherwise* than owing to the presence of tubercle bacilli in mixed milk	Number of udders in last column shown to be tuberculous by bacteriological examination	Total number of specimens submitted for examination
1904.	429	2	(Station only) 16 In addition, 23 control samples were taken at the stations, of which 9 were proved capable of causing tuberculosis.	33 Additional 10 visited as result of notification or otherwise.	78	15	18	10	3	519

Nine samples of tinned fish, meat, and rabbits were examined, all of which were found to be sterile. Other samples submitted

One sample of condensed milk contained a diplococcus.

MILK AND TUBERCULOSIS

I have pleasure in submitting my report on the work done during the year 1904.

The duties are—(1) Inspection of the Manchester Cowsheds and Dairies as to the compliance with the Manchester Regulations made under the Dairies, Cowsheds, and Milkshops Order; (2) to carry out the duties of Veterinary Inspector in the working of the Milk Clauses contained in the Manchester General Powers Act, 1899.

The latter duties include the inspection of cows in the City cowsheds, as well as the cows on the farms outside the City boundaries from which milk has been sent in.

Manchester Cowsheds.

These number 129 on 69 farmsteads, and house about 1,160 cows.

In the course of the regular inspection of farms within the City, 528 visits have been paid and 1,021 inspections of cowsheds made. The total number of inspections of cows made is 8,153.

These totals will indicate that repeated visits of inspection have been paid. However, as mentioned in previous reports, no attempt is made to obtain uniformity, some farmers being visited much more frequently than others.

I am pleased to say that I consider the past year has been a satisfactory one, the standard of cleanliness obtained being, I think, higher each year, and that, on the whole, a more thorough and up-to-date interest is being taken by the farmers themselves in the improvement of the conditions affecting their trade. This is due undoubtedly to the greater interest that the general public are taking in the question, as in some districts it is getting quite customary for considerable numbers of a farmer's customers to visit and see for themselves the conditions under which the milk they consume is produced. I do not say that they can discriminate between healthy and diseased cattle, but they are at least able to see that the cows and the buildings in which they are housed are kept in a satisfactory state of cleanliness. I hope that there will be no abatement of the public interest, but rather that it will increase: it is more effectual in obtaining improvement than any amount of inspection.

In one respect, however, I am afraid the public are to blame. In last year's report I drew attention to the fact that it is exceedingly rare to find farmers residing within the City boundaries (and the same applies to those living on the outskirts generally) who in any way cool the milk before retailing it. The public demand warm milk, and I have reason to believe that occasionally there is more warm milk sold in the City than can be produced by the cattle at the disposal of the retailers.

In some previous reports it has been stated that a more satisfactory class of milkers should be employed at some of the City cowsheds, as many of the individuals employed were of a low class, and dirty. It was also pointed out that it was desirable that milkers should wear some covering to the ordinary working clothes.

It is satisfactory to report that the employment of the class of individuals referred to in the former report is not now so extensive as it was, and that cleaner and more satisfactory milkers are now employed; further in one district at least, in which are situated some of the largest dairy farms, the farmers have all agreed to provide proper milking smocks for the milkers, and most of them have in fact done so; it is to be hoped that farmers in the other districts of the City will rapidly follow suit. It may be added that this result has followed on an outbreak of milk borne-illness at a school, which made it possible to apply greater pressure to the farmers in the district.

The work of reconstructing the insanitary cowsheds has been carried on as usual, perhaps the work does not make as rapid progress as might be desired, but work of this sort must be slow, as in most cases the preliminary negotiations are rather lengthy. During the year 1904, 14 farms have been dealt with, and the position at the end of the year was as follows: In five instances the alterations or rebuilding necessary to comply with the regulations have been carried out—in one instance the building was quite unsafe for alteration, and had to be entirely rebuilt. In two instances the work has had to be delayed. In four cases cows are no longer kept, the owners either declining to make any improvement, or being unable to do so on account of insecurity of tenure. The remaining two farmers have received plans and specifications showing how their premises can be altered, and the work will most probably be carried out this summer.

I do not propose to discuss any constructional details, as they have nearly all been considered at length in previous reports. I would merely like to say that the plans have been prepared by Mr. Hudson, C.E., who visits the farms requiring alteration with me. Usually alternative schemes are submitted, and when something definite is arrived at the plan is submitted, along with the specification, to the Medical Officer of Health.

No mention has been made in this report of the farms in Withington and Moss Side, as these districts were only incorporated near the end of the year. I may, however, say that the total number of dairy farms in the two districts is 47, and these are now subject to the same inspection as the Manchester Cowsheds, although, of course, the number of visits paid will have to be distributed over a larger number.

Manchester Cows.

During the year, 8,153 examinations were made of cows in the City cowsheds. I estimate the number of cows kept in Manchester at 1,160. Each cow has been examined several times.

The standard of the cows kept in Manchester is well maintained, the same care having been exercised in selecting them as in former years.

One case of tuberculosis of the udder occurred during the year. However, none of the milk from the cow was retailed to the public.

The case was a rather interesting one, and illustrates well how very rapidly, or rather suddenly, the disease may make its appearance in the cow's udder. During the ordinary inspection I had picked out this cow, which was a shorthorn cow, aged six years, as being a suspicious animal, and requested the owner to isolate her. At regular intervals I visited and examined this cow, but nothing definite could be observed, the cow remaining in about the same state. Ultimately the owner called upon me, and informed me that since my seeing the cow on the previous day the udder had suddenly become very much enlarged. I visited immediately, and found that three of the four quarters were greatly swollen. The cow's udder was quite well the previous day when I saw her. A good deal of constitutional disturbance seemed to accompany the onset of the tuberculosis in the udder, the pulse was accelerated, the temperature elevated to 105 F., and the appetite impaired, the animal having a generally dejected and unhappy appearance.

The condition of the udder, beyond being enlarged, showed nothing very much; it was curious, however, to find that although the swelling was very rapid and considerable in the three affected quarters, there was little evidence of pain on manipulation.

The constitutional symptoms rapidly passed off within the next three days, but the enlargement of the udder remained. The cow was slaughtered within a week at the Manchester Abattoirs.

The Manchester Milk Clauses.

There have been no changes in the methods adopted in the working of the Milk Clauses of the Manchester General Powers Act, 1899.

Samples of milk are taken at the Manchester Railway Stations, or elsewhere within the City by the Food and Drug Inspectors. These are submitted to Professor Delépine for bacteriological examination. All samples reported by him as having been found to cause tuberculosis are followed to their source at the farm by the Medical Officer of Health (or his representative) and the Veterinary Surgeon.

The Veterinary Surgeon examines all the milking cows on the farm, and takes samples of milk from cows having diseased or suspicious udders. The special samples are taken in sterilised vessels provided by Professor Delépine, and every care is taken to avoid extraneous infection. These samples are, in turn, submitted to Professor Delépine for bacteriological examination, and in this way the fact of a cow having tuberculosis of the udder is definitely proved. Samples from cows found to have diseased or suspicious udders by clinical examination, without previous station samples, are examined in the same way.

In all cases, control samples are taken to ensure that the examination has been satisfactory and the source of infection removed.

Tuberculous Milk.

It has already been stated that 8,153 inspections of cows were made in the City cowsheds during the year; and that, of this number, one cow was found to have tuberculosis of the udder.

During the year 432 samples have been taken by the Food and Drugs' Inspectors in connection with tuberculosis, and the number of farmers represented in the total is 318.

Of these 318 farmers, 188 reside in Cheshire, and 21 of them (11·17 per cent.) sent tuberculous milk; 83 live in Derbyshire, and 5 of them (6·02 per cent.) sent tuberculous milk; 14 reside in Lancashire, and 1 of them (7·14 per cent.) sent tuberculous milk; 23 reside in Staffordshire, and none sent tuberculous milk; 8 reside in Yorkshire, and 2 of them (25·00 per cent.) sent tuberculous milk; 2 reside in Shropshire, and neither sent tuberculous milk.

It will be seen that from 318 farms 432 samples have been taken, showing that in a number of cases more than one sample has been taken.

From returns supplied by farmers themselves, the estimated number of cows at these 318 farms is 6,042, equalling an average of 19 cows per farm. During the year the udders of 2,651 cows at country farms have been examined for tuberculosis. Of the milk tested by Professor Delépine from 318 farms, 29 were found to cause tuberculosis, giving a percentage of 9·1 farms sending tuberculous milk.

As the result of following up the tuberculous samples, a total of 16 cows were found and pronounced to be suffering from tuberculosis of the udder; 14 were slaughtered in my presence, and in eight instances the disease was so extensive as to necessitate condemnation of the entire carcase; in the remaining six instances the carcases, being only slightly affected, were fit for food. In two instances the cows were sold, and their ultimate disposal could not be ascertained, although enquiries were made.

In addition to the above 16 cows, which were found as the result of following up tuberculous station samples, two cows were notified by a farmer as having symptoms suspicious of tuberculosis of the udder. The cows were examined, and a sample of milk taken from each animal and submitted to Professor Delépine, who reported the milk in each instance as having been found to cause tuberculosis, etc. One of these cows, which was barren, and unlikely to be again used as a milking animal, was sold by the farmer; the other cow was isolated on the farm for some time until she had calved, and was then fattened and slaughtered, the whole carcase, with the exception of one fore-quarter, being passed as fit for food.

Thus, during the year, in all, a total of 19 cows have been proved to have tuberculosis of the udder, inclusive of the cow found in a Manchester cowshed, so that at a number of the farms no cows were found, although by means of control samples it was proved that the source of infection had been removed.

I might state here that in nearly every case where no source of infection is found, and the milk is proved by subsequent bacteriological examination to be free from tuberculosis, the farmers, when questioned, absolutely deny having sold any animals; though, if the investigation be pursued further, evidence can be obtained that certain animals have been sold. Why they should find it necessary to be untruthful is difficult to say.

Last year I inserted a table showing the percentage of tuberculous milk sent into Manchester during the previous three years. This year I again insert the same table, adding the figures for 1904:—

TABLE

Year	Number of farmers' milk tested during the year	Total number found to cause tuberculosis in the experimental animal	Percentage of farmers from each county whose milk was found to cause tuberculosis					
			Cheshire	Derbyshire	Staffordshire	Shropshire	Lancashire	Yorkshire
1901	272	27	10·46	9·23	8·00	10·00	......	......
1902	345	36	12·72	8·65	4·01	......	8·31	......
1903	329	45	14·76	9·58	15·15	40·00	......	......
1904	318	29	11·17	6·02	......	......	7 14	25·00

As stated last year in this table, the columns showing the figures for Cheshire and Derbyshire are the most important, as it is from these two counties that far the greater portion of the milk sent to Manchester is derived.

The figures for the years 1901-1903 show a steady and marked rise in the percentage of milks found to be infective, and last year I endeavoured to explain the decided rise in 1903 as being due to a more perfect system of supervision in the taking of the samples, by means of which samples of milk were obtained from districts which had never previously been tapped, with the result that a number of these milks were found tuberculous.

I am hopeful that the decrease in the figures for 1904 may be indicative of improved conditions, though I would not go so far as to say absolutely that they are. There is no doubt, however, that the operations should be made as wide as possible, and that samples of milk should be collected so as to represent every district supplying the City, for even though only one farm be visited in a certain district, the result of that visit is certainly not confined to that farm, but other farmers begin to overhaul their cattle and turn out suspicious animals.

To facilitate the necessary control over the taking of these samples, Mr. Lock has prepared, and keeps up to date, a complete index showing the name and address of every farmer whose milk has been tested since the Manchester Milk Clauses came into force; the index also supplies the number of times each farmer's milk has been tested. Further, Mr. Lock has taken care that no unnecessary samples should be taken, and has directed attention to particular districts when advisable.

I also mentioned that the diagnosis of tuberculosis of the udder was a matter of increasing difficulty each year. This difficulty has been experienced during the past twelve months.

On reviewing the past year's work in the country districts, I may, I think, fairly say that improvement has been shown, though a very great deal remains to be done.

The cows examined have been on the whole satisfactory animals, and I am glad to note that at most of the farms visited the animals kept are younger than used to be the case. The farmers are beginning to realise that if they must keep cows free from tuberculosis in the udder they must keep younger animals, instead of keeping on old cows who have had eight, nine, or ten calves, for it has been clearly shown that the risk of a cow developing tuberculosis of the udder increases with age. I have always urged upon farmers the necessity of buying only good young animals.

The farmers are going further away from home to buy their cows, as they find that the young animals purchased in Wales or Derbyshire are healthier and hardier animals, and not so susceptible to tuberculosis.

I do not believe that under the ordinary conditions of sanitation, such as exist in the country districts, it is advisable for farmers to breed and rear their own stock. It is true that they may thus obtain great milking qualities in their cows, but it is at the expense of the health of the animals, whose powers of resistance to tuberculosis must be low. I have been struck with the fact that often when I have found a cow suffering from tuberculosis of the udder the owner has expressed surprise that she should be so affected, because he had bred her himself. I have done my best to dissuade farmers from this course, and have advised them to go away from home and buy good hardy young stock. The milking capabilities of such animals may not be quite so great, and their pedigree is probably not sufficiently distinguished to be noted, but such animals do well, and are profitable, as at the end of four or five years as milking cows they readily fatten for beef.

Of course if model conditions exist, and no tuberculosis be present, then there is no reason why farmers should not breed cattle of the highest milk-producing powers by suitable crossing.

There is one practice which exists, and cannot be too strongly condemned: I refer to the practice of putting calves to a cow whose udder is diseased. The custom is common and widespread. If a farmer finds that a certain cow developes some udder affection she is probably put on one side for calves to suck, or she is milked, and the milk given to the calves. Not rarely when I have pointed out a cow to a farmer as suffering from tuberculosis of the udder he has at once said that he would discontinue sending her milk to Manchester, and would give it to the calves.

I am afraid that I cannot report any substantial improvement in the condition of the housing of the cows in the country districts, though certain landowners continue to carry out slight improvements in the buildings.

So far as the general cleanliness of the cattle and cowsheds is concerned, however, I think I may say there is marked improvement—the cows are cleaner and the cowsheds kept in better condition. Hard though it is to keep some of them clean, still improvement is shown, and due credit must be given. A special point has always been made in giving instructions to farmers that thorough cleanliness is essential, and often lengthy instructions are given to farmers to show how the best results may be obtained, and in nearly every case such instructions are received in a most kindly and tolerant manner. Occasionally, of course, an individual is met with who believes in nothing but the methods with which he is familiar, and which are certainly not conducive to cleanliness.

So far as the milkers themselves are concerned, I should like to see more improvement; in addition to washing the hands prior to milking, the wearing of clean milking smocks ought to be general, as really the working clothes of most farm labourers ought to be covered up during milking

Tuberculin Test.

During the past few years considerable discussion has taken place in various quarters as to the possibility of keeping a herd free from tuberculosis by the assistance of the tuberculin test; and it may not be out of place to give the experience obtained during the last three years in connection with a large herd of cows, the milk from which is sent to Monsall and Clayton Hospitals.

The contractor is under obligation to supply milk of a certain quality, and which must be obtained from a herd free from tuberculosis; the Corporation Veterinary Surgeon to apply the tuberculin test twice a year; the animals re-acting to the test to be cleared out at once, and all fresh cows to be tested before being added to the milking herd.

The contract under discussion was entered into in 1902 for a period of three years, so that the figures for this period are available.

The herd of cows dealt with is a fairly large one—the numbers varying from about 90 to 110; the conditions of housing are good; the cowsheds being well lighted, well ventilated; and the floors constructed of concrete, so that systematic cleansing is a matter of no difficulty, there being a good supply of water in each cowshed.

The class of animals kept are for the most part shorthorns of unknown strains, with a few Welsh and Irish cows added. No effort is made to select cows of very heavy milking properties; the primary consideration being to buy young, healthy animals, about two, three, or four years of age. The active milking-life is not a long one, as the herd is kept free from old animals.

The herd was, in the first instance, tested by the farmer's own veterinary surgeon, and since then the test has been applied by me.

In applying the test the greatest care is taken to ensure accuracy, and the preliminary examination of the animals is a careful one; care being taken to eliminate any animals whose preliminary temperatures are not normal. Otherwise all animals have been tested, regardless of the fact that in many instances animals are close to calving.

The usual methods employed are as follow:—The temperature of all cows is taken at least twice before inoculation, the injection of tuberculin being made about 10 p.m. I should say that previous to inoculation all instruments are sterilised by boiling, and just prior to inoculation the skin at the seat of operation is cleansed as well as possible. It is essential that the whole of the operation should be conducted quietly, and without ill-using the animals.

Eight hours after inoculation temperatures are again recorded, and this is continued every four hours until the end of the 20th hour after inoculation,

Below is presented a table showing the actual results of each application of the test :—

Date of Test	Total Number Tested	MILKING HERD. Animals having been previously tested				PROBATIONARY ANIMALS. Animals not previously tested, but purchased subject to passing the test.				Total Number of Animals Passing Test
		Number Tested	Number Re-acting	Number Passed	Doubtful Re-actions	Number Tested	Number Re-acting	Number Passed	Doubtful Re-actions	
October, 1902.........	101	91	11	80	0	10	4	6	0	86
April, 1903............	108	88	3	85	0	20	6	13	1	98
October, 1903.........	108	98	1	96	1	10	4	5	1	101
April, 1904............	103	76	0	76	0	27	10	17	0	93
October, 1904.........	103	85	0	84	*1	18	4	13	1	97

*Animal tested, but developed Bronchitis during test.

These figures are rather interesting, and may be briefly reviewed in detail.

At the first testing in 1902 it will be seen that out of 91 cows in the milking herd proper 11 cows responded to the test, giving a percentage of 13·18 re-actions, which is fairly high.

Immediately after the test was complete the re-acting animals were cleared out, and all the cowsheds at the farm were disinfected with chlorinated lime solution. The work was well done, the whole of the cowshed, ceiling, walls, floors, etc., being treated.

At the second testing in 1903 the number of re-acting animals in the herd proper was 3 (3·40 per cent.), and it should be noted that 2 out of these 3 cows occupied stalls that had previously contained re-acting animals, and in the third case the cow had also occupied a stall in which an infected animal had been kept, but at the time of the test she was in a different stall.

At the third test in October, 1903, one animal re-acted, and this animal stood in stall No. 77, there having at the previous test been an infected animal in stall 78.

At the last two tests there were no re-acting animals in the herd proper, though at the test applied in October, 1904, there was one animal which gave a doubtful re-action. This cow developed bronchitis during the application of the test, therefore the temperature chart could hardly be reliable in this case. However, no risks were taken, and the cow was cleared out of the herd at once to a loose box, and directly she recovered was disposed of.

After the preliminary disinfection of the sheds by the Corporation disinfectors the disinfection has been systematically carried out by the farmer himself, who purchased a spraying machine for the purpose.

I am glad to say that I have had no embarrassing number of doubtful re-actions, which are, in my opinion, most unsatisfactory to both the farmer and to the Veterinary Surgeon. That the tuberculin used by me was satisfactory is, I think, proved by the number of re-actions obtained in the probationary animals, and I should add that none but absolutely fresh tuberculin put up in sealed tubes is ever used.

I have not entered into a detailed consideration of the test as applied to the animals bought subject to passing the test, and which I class as probationary animals; it is sufficient to mention that out of the 85 animals in this class which were tested during the three years a total of 28 re-acted to the test and 3 were doubtful, giving a percentage of 32·94 re-acting animals. This percentage is a strikingly high one when it is taken into consideration that all of these animals were young, the bulk of them having never been in any milking herd.

It is, of course, quite impossible to obtain such results unless the farmer whose herd is being dealt with is a man who is ready and willing to carry out most thoroughly all the precautions advised, and the greatest credit is due to Mr. Walley for the manner in which the work has been done. It is no easy matter to keep control over a large herd, and to select animals suitable for the purpose. One point brought out by the testing of these cattle is that to supply a given quantity of milk from animals free from tuberculosis requires a slightly larger number than if it were supplied from a herd on which no restrictions are placed; the heavy milking strains do not stand the test well, as in the case of the probationary animals it was found that those young cows which promised to make the best and heaviest milkers had to be rejected when tested.

Appended are particulars of the disposal of all cows found suffering from tuberculosis of the udder during the 12 months ending December 31st, 1904:—

Case 165.—This cow was found on January 4th when following up a tuberculous station sample. The owner was written to by the Medical Officer of Health, and the usual letters were also sent to the Medical Officers of Health for the County and District.

As no reply was received to the first letter, the farmer was again written to by the Medical Officer of Health. The farmer, in reply, wrote to say that the cow would be slaughtered at Mr. ——, ——, Knutsford, on February 11th.

The Veterinary Surgeon attended on that date and found a fairly good carcase, which was passed as fit for food.

Case 174.—This cow was discovered on April 14th in the usual manner, on following up a tuberculous station sample.

The Medical Officer of Health wrote to the farmer, and at the same time to the Medical Officers of Health for the County and District, notifying the result of the examination.

On May 16th the farmer replied that the cow in question died a few days after the visit of the Veterinary Surgeon, and had been at once removed to a local bone works for manure.

A copy of this letter was sent to Dr. Kaye and also to the local Medical Officer of Health, who confirmed the farmer's statement.

Case 176.—This cow was found on July 21st as the result of two previous infected station samples,

As in the first case, the farm was visited by the representative of the Medical Officer of Health, accompanied by the Veterinary Surgeon ; but at this visit no cow was found. A control sample was taken, and this being again tuberculous the farm was again visited on July 21st as above mentioned, and on this occasion the cow was found.

The farmer replied, in answer to the usual letter from the Medical Officer of Health, that the cow would be slaughtered on August 23rd.

Mr. Brittlebank being away, Mr. Holburn attended and witnessed the slaughtering, and reported that the carcase was quite unfit for food. The carcase was cut up and buried.

Case 180.—This cow was found in the usual manner on April 27th.

On June 2nd the farmer was written to by the Medical Officer of Health, who also wrote to Dr. Vacher and Dr. Gough.

The farmer wrote, in reply, that he would have the cow slaughtered on June 7th. On that date the Veterinary Surgeon attended and witnessed slaughter of the cow. The carcase was in rather poor condition. The disease being localised, the carcase, which was hardly poor enough to justify condemnation, was passed.

Case 181.—This cow was found on August 10th in the usual manner on following up an infected station sample.

In the first instance the farm was visited on May 19th, but no cow showing any signs suspicious of tuberculosis of the udder was found. A control sample was taken, which on being tested by inoculation was found to cause tuberculosis, so that a second visit was necessary. On this occasion the cow was found, but the lesion was extremely slight—in fact was nothing more than slight hypertrophy of the quarter.

The Medical Officer of Health wrote advising the farmer to slaughter as soon as possible, but the farmer replied saying that he could not afford to take this course, but had isolated the cow, and intended to feed calves on her milk.

The Medical Officer of Health at once wrote pointing out the foolishness of such a procedure, and in reply the farmer wrote asking for permission to sell the cow to a farmer near at hand—not as a milch cow.

After further correspondence, the farmer stated that the cow would be slaughtered at Mr.——, ——, Macclesfield, on September 21st. The Veterinary Surgeon attended, and found the carcase unfit for food.

Case 183.—This cow was found on May 16th when following up a tuberculous station sample. The usual letters were sent out by the Medical Officer of Health (June 8th) to the farmer and to the Medical Officers of Health for the County and District.

On July 8th the farmer wrote "that he had isolated the cow, was giving her milk to the pigs, and intended to feed her for slaughter," and at the same time promised to notify the Medical Officer of Health when the slaughter would be carried out.

The farmer kept the cow a long time, as it was some time before the quantity of milk given diminished.

The Veterinary Surgeon saw the cow occasionally while she was being fattened, and when once she did cease milking fattened rapidly.

On March 5th the cow was slaughtered at the farm, the farmer's veterinary surgeon also being present. The carcase was an excellent one, and was good beef.

Case 184.—This cow was found in the usual manner by the Veterinary Surgeon. However, no samples being taken at the time, the Veterinary Surgeon had to rely upon his own diagnosis.

The farmer agreed to slaughter at once. Arrangements were made, and the slaughter carried out within a week. The carcase was a good one, and was passed for food. The post-mortem evidence of tuberculosis in the udder was sufficient.

Case 185.—This cow was found on May 17th when following up a previous infected station sample.

The cow in question at the time of discovery was in poor condition, and the Veterinary Surgeon advised the farmer to slaughter as soon as possible The farmer agreed, and the cow was slaughtered within a week, the Veterinary Surgeon being present. The whole carcase was condemned as unfit for food.

Case 187.—This cow was found on June 2nd, the station sample of milk from this farm having been found to cause tuberculosis.

As soon as the bacteriological report was received from Professor Delépine the farmer was written to by the Medical Officer of Health, who also notified the Medical Officers of Health for the County and District.

The farmer replied that he would have the cow slaughtered as soon as he could make the necessary arrangements, and on July 4th another letter was received from the farmer intimating that the cow would be slaughtered on the 6th instant.

The Veterinary Surgeon attended on that date and witnessed slaughter of the cow. The carcase was fairly well nourished, but extensively diseased, and was condemned. Mr. Sadler, the Secretary to the Cheshire Milk Producers' Association, was also present.

Case 189.—This cow was found on July 31st, as the result of following up a tuberculous station sample.

The farmer was written to by the Medical Officer of Health, who also wrote to the Medical Officers of Health for the County and District.

The farmer replied that he had isolated the cow, and would not sell any more milk from her. The Medical Officer of Health again wrote asking for an undertaking to slaughter, and in reply the farmer wrote stating that the cow would be slaughtered on September 14th.

On that date the Veterinary Surgeon attended the farm, and the farmer stated that he did not like to slaughter the cow as she was near calving—it should be stated that the farmer was advised, in the first instance, not to slaughter until the cow had calved. The farmer's suggestion was agreed to, and slaughter was deferred.

On November 18th the farmer was written to by the Medical Officer of Health, asking how the cow was progressing. In reply, a letter was received from the Secretary of the local Milk Producers Association stating that the farmer had been to them, and stated that all symptoms of tuberculosis in the udder had disappeared, and asking if it would still be necessary to slaughter.

The Medical Officer of Health replied that, after the statement received, the matter had better be deferred until Mr. Brittlebank could again see the cow.

The Veterinary Surgeon again examined the cow on December 15th, and found that there was a well-developed lesion in the right fore-quarter, which was of a distinctly tuberculous character.

A sample of milk was taken and submitted to Professor Delépine, who reported the milk as having been found to cause tuberculosis.

The farmer was informed of the result of the examination, and ultimately agreed to slaughter, which was carried out later in the presence of the Veterinary Surgeon. The carcase was passed.

Case 191.—This cow was discovered in the usual manner on September 13th.

The Medical Officer of Health wrote to the farmer, and to Drs. Vacher and Rushton.

On October 4th a letter was received from the farmer intimating the slaughter of the cow at the Harrington Bone Works on the 12th instant. The Veterinary Surgeon attended and witnessed the slaughter.

Case 193.—This cow was found on September 22nd as the result of following up an infected station sample.

On October 24th the farmer was written to by the Medical Officer of Health, who also wrote to Drs. Barwise and Fentem.

On October 28th a letter was received from the farmer doubting the result of the examination, and intimating that they had forwarded another sample for examination. The bottle containing the sample was broken in transit, and the farmer was notified of this, and at the same time it was pointed out that there could be no doubt about the result of the previous examination; further, the farmer was asked to give the required undertaking to slaughter. By return of post a letter was received giving the required undertaking.

As nothing was heard for some time the farmer was again written to, and replied that as soon as the cow was dry she had been sold for grazing. The Medical Officer of Health wrote asking for name of purchaser, but no reply was forthcoming. Nothing was ascertained as to the ultimate disposal of the animal.

Case 198.—This cow was found on November 3rd as the result of following up an infected station sample. In the first instance the milk was reported as coming from another farmer, and his farm was visited; but, nothing being found, a further sample was taken, which again proved infective. The farm was again visited, and it was ascertained that another farmer's milk was consigned to Manchester along with that of the farmer whose name appeared on the cans. This farm was visited, and the source of infection found.

The usual letters were sent out by the Medical Officer of Health.

The farmer agreed to slaughter on November 22nd. The slaughter was carried out in the Veterinary Surgeon's presence; and it was found that the carcase was too extensively diseased to be fit for food.

Case 205.—This cow was found on December 7th when following up a previous tuberculous station sample. On January 4th the Medical Officer of Health wrote to the farmer and to Drs. Vacher and Kenyon. On January 9th the farmer wrote stating that the cow had been isolated, but asked that he might be allowed to feed the animal for the butcher; the Medical Officer of Health raised no objection.

On January 27th Dr. Kenyon wrote stating that Mr. Willis's cow would be slaughtered at Dobbins' Manure Works, and that the inspector would be present.

Case 150.—Cow found in Manchester. This case is described in the earlier part of the report.

Case 195.—Notification. Two cows. This case is also reported earlier.

J. W. Brittlebank, M.R.C.V.S.

THE MILK SUPPLY.

COOLING.

From the reports made by the Veterinary Surgeon it is to be feared that in country districts there has not been that improvement, as regards the condition of the cowsheds and handling of the cows, which is necessary for reasonable safety. On the other hand, Professor Delépine's analysis of milks submitted to him shows, except in regard to tuberculosis, a great improvement. These reforms are necessary :—

1. Cows of a less advanced age are required, so as to diminish the risk of tuberculosis of the udder. This, I am informed, farmers are, in their own interest, beginning to recognise.

2. As regards cleanliness of the cows, suitable water supply, cleanliness of the cowshed, and cleanliness of the milker there is improvement, but to a very inadequate extent, in rural districts.

3. It is of the most urgent importance that, in summer especially, milk shall be at once submitted to cooling processes—to refrigeration, if possible—and that it shall be kept in an ice chamber prior to despatch.

It should be kept cool on its way to the railway station, and this is easily effected by spreading a wet cloth over the milk cans.

On its railway journey it should be placed in a special cool van containing ice, and acting practically as an ice chamber.

On arrival, unless immediately handed over to the milk dealer, the cans should be placed in an ice store.

In the subsequent treatment of milk the same policy should be pursued.

Progress has begun in respect of each of these requirements.

Farmers are contemplating putting down ice-making plant, and one farmer amongst those by whom we are supplied has already done so.

Milk dealers are moving in the direction of providing cold storage. In June, 1904, the Milk Dealers' Association approached the Medical Officer of Health with a view to obtaining greater cleanliness in the railway vans carrying milk, and cooler milk trucks. Accordingly, arrangements were made for interviews between the representatives of several railways on the one part, and on the other Alderman McDougall, the Medical Officer of Health, and representatives of the Manchester and Salford Milk Dealers' Association.

The means by which the objects aimed at were to be obtained were discussed, and, as regards cleanliness of the trucks, there is reason to believe that something was effected.

Some difference of opinion existed as to the best means for securing cooling of the milk.

It will probably be found that the provision of non-conducting vans carrying ice is the only sufficient and suitable remedy.

Mr. Hailwood threw out the valuable suggestion that the Railway Companies might provide cold storage for milk arriving overnight or early in the morning, which might otherwise have to stand about the station. Provision of such storage, it has been said, is contemplated by one Railway Company.

The Milk Dealers' Association have recently also designed a wooden cold store for milk, to be erected in connection with small retail dairies, which appears likely to be effective.

THE FACTORY AND WORKSHOP ACT, 1901.

I beg to submit a statement of work done under this Act, on the Form issued by the Home Office.

The alterations to cellar bakehouses are now practically complete, though there are still eight which are neither closed nor satisfactory. They will, however, be disposed of during the present year.

Factories, Workshops, Laundries, Workplaces, and Homework.

1.—Inspection.

Including Inspections made by Sanitary Inspectors or Inspectors of Nuisances.

Premises	Number of Inspections	Number of Written Notices	Number of Prosecutions
Factories (including Factory Laundries) ... ... Workshops (including Workshop Laundries) ... Workplaces	18557	652	25
Homeworkers' Premises	3648	27	...
Total	22205	679	25

2.—Defects Found.

Particulars	Number of Defects: Found	Number of Defects: Remedied	Number of Defects: Referred to H.M. Inspector	No of Prosecutions
Nuisances under the Public Health Acts:—				
Want of cleanliness	43	43	...	...
Want of ventilation	26	26	...	...
Overcrowding	10	10	...	...
Want of drainage of floors	8	8	...	...
Other nuisances	217	217	...	3
Sanitary accommodations—				
Insufficient	27	6	...	...
Unsuitable or defective...	32	1	...	...
Not separate for sexes	11	3	...	...
Offences under the Factory and Workshop Act:—				
Illegal occupation of underground bakehouse (S. 101)	...	...	...	...
Breach of special sanitary requirements for bakehouses (SS. 97 to 100) ...	...	...	...	...
Failure as regard lists of outworkers (S. 107)	...	...	...	18
Giving out work to be done in premises which are unwholesome (S. 108)	...	...	...	...
Giving out work to be done in premises which are infected (S. 110) ...	...	...	...	...
Allowing wearing apparel to be made in premises infected by Scarlet Fever or Smallpox (S. 109)	...	...	...	...
Other offences	1497	1497	...	4
Total	1871	1811	326	25

3.—Other Matters

Class	Number	
Matters notified to H.M. Inspectors of Factories :—		
Failure to affix Abstract of the Factory and Workshop Act (S. 133)	326 (see Form 2)	
Action taken in matters referred by H.M. Inspectors as remediable under the Public Health Acts, but not under the Factory Act (S. 5)—		
Notified by H.M. Inspector	62	
Reports (of action taken) sent to H.M. Inspectors	128	
Other	66	
Underground Bakehouses (S. 101) :—		
In use during 1903	140	
Certificates granted in 1903	22	
Certificates granted in 1904	38	
In use at the end of 1904	74	
	Number of	
Homework :—	Lists	Outworkers
Lists of Outworkers (S. 107) :—		
Lists received	966	7918
Addresses of outworkers forwarded to other Authorities		1243
Addresses of outworkers received from other Authorities		31
Homework in unwholesome or infected premises :—	Wearing Apparel	Other
Notices prohibiting homework in unwholesome premises (S. 108)	...	...
Cases of infectious disease notified in homeworkers' premises	16	...
Orders prohibiting homework in infected premises (S. 110)	10	...
Workshops on the Register (S. 131) at the end of 1904 :—		
Workshops	4886	
Bakehouses	611	
Total number of Workshops on Register	5497	

The action taken up to this time in respect of underground bakehouses is set forth in the following tables :—

Bakehouses Closed during the Year 1904.

Situation	Situation
Cellars.	*Cellars*—continued.
18, Fearnley Street, Hulme.	64, Beswick Street.
49, Market Street.	124, Brunswick Street.
24, Bury New Road.	58, Brook Street.
64, Cheetham Hill Road.	16, Downing Street.
94, Cheetham Hill Road.	66, Everton Road.
228, Cheetham Hill Road.	73, Everton Road.
41, Lord Street.	111, Gorton Lane.
5, Nightingale Street.	94 and 96, London Road.
4, Pimblett Street.	5, Mosley Street.
513, Rochdale Road.	195 and 197, Oxford Road.
701, Rochdale Road.	14, Sackville Street.
424, Collyhurst Road.	122, Stockport Road.
7, Hendham Vale.	136, Stockport Road.
21, Garnett Street.	686, Stockport Road.
4, Butler Street.	163, Stockport Road.
4, Cookson Street.	599, Stockport Road.
54, Varley Street.	55, Saint John's Road.
117, Butler Street.	83, Upper Brook Street.
96, Every Street.	216, Upper Brook Street.
326, Oldham Road.	264, Upper Brook Street.
378, Oldham Road.	169, Wilmslow Road.
584, Oldham Road	173, Wilmslow Road.
720, Oldham Road.	203, Wilmslow Road.
25, Oldham Road.	279, Wilmslow Road.
520, Oldham Road.	30, Wilmslow Road.
310, Oldham Road.	63, Booth Street West.
77, Piccadilly.	23, Clarendon Street.
4 and 6, Little Ancoats Street.	34, Cavendish Street.
51, Mitchell Street.	250, Chester Road.
26, Rochdale Road.	89, George Street.
136, Rochdale Road.	13, Gloucester Place.
152, Rochdale Road.	4, Harris Street.
2, Hillkirk Street.	1, Ludlow Street.
255A, Wellington Street.	107, Lower Moss Lane.
270, Rochdale Road.	55, Princess Street.
263, Ashton Old Road.	420, Stretford Road.

Bakehouses Closed during the Year 1904—Continued.

Situation	Situation
Above Ground.	*Above Ground*—continued.
128, Halliwell Lane.	89, Chester Road.
13, Lansdown Road.	38, Chorlton Road.
58, Ashton New Road.	168, Chester Road.
228, Ashton Old Road.	138, Clopton Street.
Back Grafton Street.	151, Chester Road.
30, Brunswick Street, West Gorton	196, Great Jackson Street.
137, Brunswick Street, C.-on-M.	117, Chester Road.
87, Birch Lane.	119, Chester Road.
133, Clowes Street.	158, Lower Moss Lane.
33, Gray Street.	74A, Oxford Street.
191, Princess Street.	45, Percy Street.
529, Stockport Road.	57, Radnor Street.
569, Stockport Road.	81, Tamworth Street.
12, Summer Place.	64, Upper Medlock Street.
32, Worsley Street.	69, Upper Medlock Street.
2, Blossom Street.	73A, Clarendon Street.
15, Chorlton Road.	58, Ashton Old Road.

The following table shows the amount of work done since the commencement of operations in 1894 :—

Year	Bakehouses Altered	Bakehouses Closed
1894	3	3
1895	16	12
1896	28	19
1897	22	31
1898	18	17
1899	12	18
1900	8	13
1901	3	17
1902	0	19
1903	2	16
1904	73	106
	185	271
	Total, 456.	

The alterations here mentioned have been in all cases considerable, and were, for the most part, carried out according to careful specifications drawn up in the City Surveyor's Department to comply with the requirements of the Medical Officer of Health.

72 underground bakehouses were closed in 1904, and 50 were altered.

Altogether, since 1894, 185 bakehouses have been altered and 271 have been closed.

The new bakehouses erected during the year 1904 are as follows :—

Statement of the Bakehouses approved by the Improvement and Buildings Committee, and completed during the year 1904, *numbering* 27.

Situation	Owner	Date of Completion
Derby Street and Bath Street, Hulme	G. R. Geldard	January 6th, 1904
Mary Street, Harpurhey	T. Makin	September 7th, 1904
Victoria Road, Rusholme	G. Edwards	Ditto
Lime Street, Hightown	F. Schofield & Sons ...	October 6th, 1904
Caister Street, Chorlton-upon-Medlock	J. Almond & Sons......	October 20th, 1904
Copper Street and Tin Street	M. & F. Boddy	November 8th, 1904
73, Great Ducie Street	A. Hyman	November 25th, 1904
Lyndhurst Street, Ardwick	H. Morris	June 28th, 1904
Berwick Street, Chorlton-upon-Medlock	W. Ryder	November 18th, 1904
Inkerman Street and Topley Street	R. Weatherby & Sons...	January 3rd, 1904
694, Stockport Road...	H. & I. Stott	January 14th, 1904
Bath Street and Halston Street	A. E. Clarke	December 28th, 1904
203, Wilmslow Road, Rusholme	J. Lowry..................	June 6th, 1904
Addington Street, Oldham Road	R. Kay	June 18th, 1904
Chatsworth Street, Beswick	J. Morris	June 28th, 1904
82, Dickenson Road...	H. Bickerton	June 23rd, 1904
94 and 96, London Road	T. W. Brown	Ditto
49, Market Street	— Derbyshire	April 25th, 1904
Clarence Street, Cheetham	C. Stroll..................	January 7th, 1904
Grafton Street, Chorlton-upon-Medlock	Hill & Heys	April 6th, 1904
51, Booth Street West	J. J. Boden	April 26th, 1904
340, Stretford Road ...	J. P. Smith...............	April 30th, 1904
64, Cheetham Hill Road	S. Levy	April 27th, 1904
Sackville Street, City...	S. Sharpe	May 4th, 1904
163, Stockport Road...	M. Marler	May 20th, 1904
279, Wilmslow Road, Rusholme	G. Alltree	May 17th, 1904
Stockport Road and Pimblott Street	J. Worsley	June 8th, 1904

HOUSING OF THE WORKING CLASSES.

It is not intended in this report to do more than give a brief outline of facts relating to the operations of the Housing Sub-Committee. The discussion of the general question must necessarily extend to great length. A few words of introduction, however, may not be amiss.

Now that the number of back-to-back houses is comparatively small, other conditions are receiving more attention. At the same time, social questions are becoming more prominent.

The death-rate in groups of enumeration areas have been worked out in the more central parts of the City, and are shown on the following map. (See Map.)

It will be seen that the more central portions of the City, and notably special portions of these, exhibit a very high death-rate. This is largely due to the social condition and habits of the people occupying those areas—poverty, drink, crowding, all contribute.

In some it is due to the excessive number of common lodging-houses, in others to the squalid habits of the population. Conditions of housing affect the result, but do not constitute the largest factor.

In dealing with such conditions, the most elementary requirement is a firm sanitary government. Overcrowding, whether in private families or in lodging-houses, must be repressed within the limits of the law and the requirements of a reasonable humanity. Insanitary conditions must be removed, whether of private or public origin.

It is, unfortunately, the case that, in many districts, houses are crowded on an area in an unwholesome manner.

It will be necessary to have a schedule of such areas, and to come to a clear conclusion as to whether such areas are to undergo reconstruction or amendment merely.

It is quite certain that reconstruction of many insanitary areas can only be effected by erecting tenements.

In any such reconstructions undertaken for the benefit of the poor working classes, the new buildings should be under municipal control.

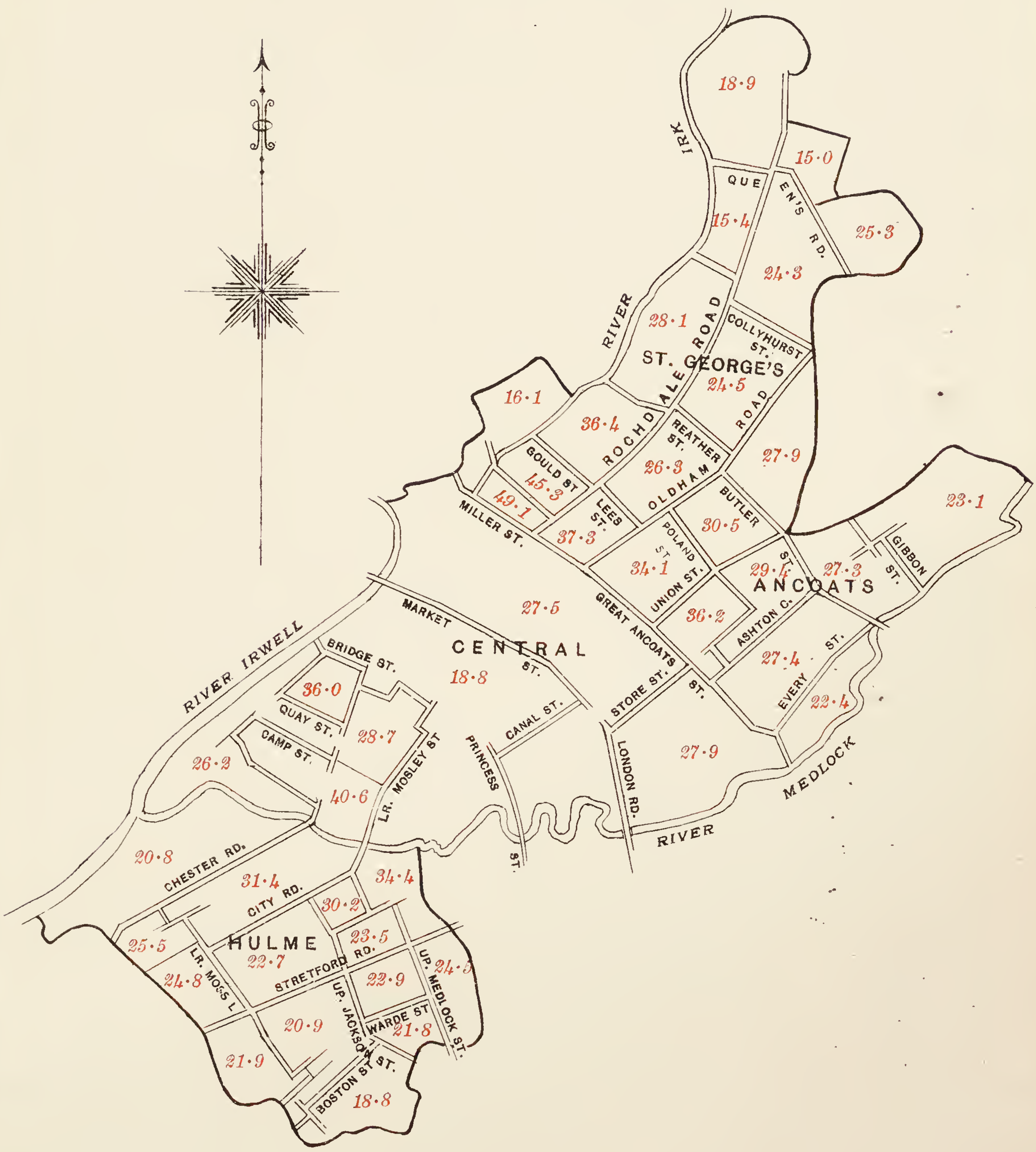
In the absence of this condition, I believe the expenditure of public money involved in reconstruction of areas to be scarcely justified.

The question of the clearing of insanitary areas at the expense of the community is too complicated to be considered here,

— SKETCH MAP —

Shewing the Death Rate for the three years, 1900-2, in selected areas of the—

ANCOATS, ST. GEORGE'S, AND HULME SANITARY DISTRICTS.



The work of this character done by the Sub-Committee since its inception is summarised in the following tables :—

Return showing the Number of Houses Closed, Demolished, or added to other Houses, thereby being discontinued as separate habitations within the City, from February, 1885, to December 31st, 1903, also for 1904.

Sanitary District	Number of Houses Closed, Demolished, or added together or to other Houses		Number of Houses Closed which have not up to the present time been allowed to be re-opened		Number of Houses Closed which have been subsequently demolished		Number of Houses Closed, and subsequently added together or to other Houses, thereby being discontinued as separate habitations	
	February, 1885, to Dec. 31st, 1903	1904	February, 1885, to Dec. 31st, 1903	1904	February, 1885, to Dec. 31st, 1903	1904	February, 1885, to Dec. 31st, 1903	1904
1	354	1	84	1	155	...	115	...
2	612	25	116	23	389	2	107	...
3	677	15	119	15	267	...	291	...
4	22	...	11	...	10	...	1	...
5	4	...	1	...	1	...	2	...
6	655	2	134	2	302	..	219	...
7	240	..	50	...	146	...	44	...
8	43	2	16	...	4	...	27	2
9	743	16	86	...	401	12	252	4
10	546	14	35	10	320	2	191	2
11	402	35	16	1	222	14	164	20
12	256	34	68	19	71	13	117	2
13	20	1	6	1	4	...	10	...
14	361	32	48	20	218	6	95	6
15	309	16	39	6	179	2	91	8
16	17	2	1	...	10	1	6	1
17	203	8	26	2	114	6	63	...
18	592	5	100	1	323	...	169	4
19	28	...	...	...	9	...	19	...
lackley...... 20	6	...	6	...	...	...	...	...
Iarpurhey... 20	15	...	...	...	13	...	2	...
21	...	...	...	...	...	...	...	...
22	166	8	10	2	73	4	83	2
23	27	17	6	13	7	4	14	...
eswick 24	...	...	...	...	...	...	...	...
radford 24	68	...	25	...	26	...	17	...
25	...	...	...	...	...	...	...	...
26	35	...	17	...	7	...	11	...
rdwick...... 27	...	...	...	...	...	...	...	...
'est Gorton 27	16	...	2	...	8	...	6	...
28	74	...	3	...	27	...	44	...
Totals	6491	233	1025	116	3306	66	2160	51

In the following table is seen the rate at which Insanitary Dwellings have been closed since 1885. This was greatest in the years 1892 to 1896. If it has since slackened, this is owing not to any lack of insanitary dwellings, but to fear of producing overcrowding, and to difficulties which have arisen :—

Return showing the Number of Houses Closed, Demolished, or added to other Houses, thereby being discontinued as Separate Habitations within the City in each Year from February, 1885, to December 31st, 1904 (January to December in each Year).

	1885 (From February)	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	Totals
Number of Houses Closed, Demolished, or added to other Houses	56	103	117	191	282	165	287	564	507	782	707	507	284	297	641	273	57	346	325	233	6724
Number of Houses Closed which have not up to the present time been allowed to be re-opened	...	4	11	16	39	16	38	56	108	57	61	49	31	44	173	95	10	75	142	116	1141
Number of Houses Closed which have been subsequently demolished	46	69	55	112	170	70	116	279	195	511	415	296	185	154	280	100	37	119	97	66	3372
Number of Houses Closed, and subsequently added together or to other Houses, thereby being discontinued as separate habitations ...	10	30	51	63	73	79	133	229	204	214	231	162	68	99	188	78	10	152	86	51	2211

A promising scheme for the relief of the central portion of the City was the acquisition of the Blackley area, and the provision thereon of suitable homes for the working classes.

The success of this scheme has been delayed by the distress prevailing during the last two years. It is, in my opinion, merely delayed, and its usefulness will be manifest as soon as the City recovers from its recent depression.

There can, however, be no doubt as to the great value of the work accomplished by the Housing Sub-Committee in their operations in connection with individual unhealthy dwellings or groups of dwellings.

On the 15th March, 1904, the Local Government Board gave its assent to the erection of a block of tenement dwellings in Rochdale Road designed by the City Architect. These consist of 32 three-roomed tenements and 32 four-roomed tenements, and are generally accepted as having been excellently devised.

In the district containing these dwellings the City Council expect that dwellings will not be condemned, except where it is absolutely necessary, until the new dwellings are occupied.

It may be said, however, that there are now a considerable number of empty houses in this district, a circumstance which could not have been anticipated when the understanding was entered into.

The number of new dwellings erected may be taken as a fair measure of the general circumstances of the population, making allowance for the tendency to excess of building in times of prosperity and to undue cessation of building operations under reverse conditions.

The following table exhibits the number of new buildings erected in the different sanitary districts of the City, and declared habitable during the year 1904.

A slight revival of building operations is manifested in 1904. This is chiefly in the district of Rusholme, however.

The table shows the variations in different districts. In Harpurhey there was almost complete arrest. In other districts, again, there was increased activity. Notably is this the case in Cheetham and Newton.

In the same manner there is slight revival in the building operations carried on in the districts around the City, though this varies in extent,

The renewal of activity is most evident in Stretford, Withington and Didsbury, and Levenshulme.

The figures are as follows :—

A.—Statement as to the Number of Dwelling-houses Certified as Fit for Human Habitation in the various Divisions of the City between 1890 and 1904.

District	1st Nov., 1890, to 31st Oct., 1891	1891 to 1892	1892 to 1893	1893 to 1894	1894 to 1895	1895 to 1896	1896 to 1897	1897 to 1898	1898 to 1899	1899 to 1900	1900 to 1901	1901 to 1902	1902 to 1903	1903 to 1904	Totals
Ancoats ...	31	195	54	70	7	97	113	53	25	28	33	1	4 including 1 Lodging house	11	722
Central ... } St. George's }	Note:—193 Artisans Dwellings	...	...	...	...	...	...	...	...	...	...	5	1	9	208
Cheetham	8	38	76	97	37	155	269	370	315	128	253	171	199	240	2356
Crumpsall	17	7	18	24	44	39	37	41	18	102	53	56	82	85	623
Blackley ...	29	11	13	5	19	41	31	56	67	58	33	42	57	53	515
Harpurhey	55	60	60	170	191	342	253	346	327	169	129	70	92	14	2278
Moston ...	22	12	74	89	148	193	225	263	248	282	179	78	109	156	2078
Newton ...	40	20	10	30	65	140	96	136	134	110	90	211	167	230	1479
Bradford ...	36	39	49	21	65	67	198	91	103	198	47	239	29	40	1222
Beswick ...	2	8	15	8	...	97	118	128	98	119	175	94	...	15	877
Clayton ...	6	61	6	9	39	111	152	161	229	234	164	104	107	113	1496
Ardwick ...	4	34	25	59	177	261	192	295	361	145	110	109	171	13	1956
Openshaw	177	169	65	15	60	69	71	152	119	182	80	190	145	155	1649
Gorton ...	178	110	30	2	2	20	87	236	178	57	...	...	...	50	950
Rusholme and Kirk	51	37	76	89	211	277	294	354	486	462	288	346	258 } 122 }	453	3804
C.-on-M. ...	26	97	97	88	18	36	46	57	1	32	48	27	12	15	600
Hulme......	...	2	1	1	...	29	24	4	3	2	4	1	6	...	77
City Totals	682	1093	669	777	1083	1974	2206	2743	2712	2308	1686	1744	1561	1652	22890

B.—New Houses Certified in Outside Districts in 1904.

Districts	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904
Salford	...	254	564	454	613	883	872	1268	885	674	818	733	603	599
Eccles	141	164	109	100	118	113	165	219	202	215	215	185	244	226
Stretford	30	43	38	274	356	313	355	340	262	265	320	329	379	483
Urmston	73	45	42	34	80	102	135	88	43	18	21	24	35	106
Withington Urban District Council:														
Withington, including Whalley Range	23	31	17	50	70	79	162	171	225	169	59	52	35	139
Didsbury	31	42	33	26	79	55	45	66	139	66	37	34	43	68
Burnage	...	...	26	21	...	1	24	13	1	14	14	59	1	...
Chorlton-cum-Hardy	81	63	10	37	94	155	182	152	55	191	220	182	247	215
Moss Side	...	...	...	...	...	...	...	119	35	403	400	314	157	234
Levenshulme	...	...	...	...	...	...	...	224	290	420	180	236	278	318
Droylsden	...	...	...	...	...	...	...	126	36	41	43	...	135	50
Gorton	...	...	...	...	...	...	...	397	411	352	353	187	402	362
Totals	379	632	839	996	1410	1701	1940	3183	2584	2828	2680	2335	2559	2800

The whole question of housing will demand comprehensive survey, and must be deferred for the time.

THE MIDWIVES ACT, 1902.

Much criticism has been levelled at this most useful measure, yet few of its critics would refuse to admit that it is likely to produce a profound and most beneficial effect on the training and practice of midwives; nor would any medical man with much experience of the management of labour in the less wealthy quarters of the City, be likely to dispute the need for a less ignorant and more careful class of midwives.

It is to those gynecological experts who have been profoundly impressed by the losses inflicted by many of these women, and by the sufferings often entailed on those who have escaped with their lives, that we owe this measure, which is calculated, as it stands, if suitably used, to create a revolution in midwifery practice.

The rights of the existing class of midwives are strictly respected. Yet, as we shall see, the Act and the rules framed under it permit a sufficient supervision over the entire field of practice outside that occupied by the medical profession.

The Act came into operation on April 1st, 1903.

After the 1st of April, 1905, a midwife is a person certified under the Act.

Section 1, sub-section 1, enacts that after the 1st of April, 1905, a person who is not certified under the Act shall not in any way give it to be understood that she is a person specially qualified to practice midwifery, or is recognised by law as a midwife, under a penalty of not exceeding five pounds.

Section 1, sub-section 2, requires that from and after the 1st day of April, 1910, no woman shall habitually and for gain attend women in childbirth otherwise than under the direction of a medical practitioner, unless she be certified under the Act, under a penalty not exceeding ten pounds.

It might at first appear as if the effect of these two sub-sections, taken along with the supervision which the Act provides for in respect of midwives, would lead to the less competent women not seeking to be registered.

It is very doubtful whether any such effect has been produced, at all events in populous districts. The gulf fixed between a certified midwife and an uncertified person is so great in urban districts that it may be assumed that the effort to secure certification has been almost universal.

So far as one can judge, there has been no great reluctance on the part of the Board to certify bonâ-fide midwives.

It is to be hoped that this is so, since the control of the Supervising Authority over local midwives is tolerably complete, and extends apparently to permanent suspension.

Section 2 of the Act confers on women holding the certificate of certain licensing bodies the right to be certified under the Act, but extends the same privilege to all persons who have been in bonâ fide practice for at least one year at the passing of the Act, though it requires satisfactory evidence that they bear a good character.

By Section 6 the roll of midwives separates those who have been enrolled by virtue of prescriptive right and those who have been entered as the result of examination. It also gives the means of separating those who are specially privileged under Section 2 and those who are entered as being bonâ-fide midwives.

The only real distinction, however, is between those who have and those who have not passed an examination as instituted under the Act.

The Act provides (Section 3) for the constitution of a Central Authority (the Central Midwives Board), and prescribes the mode of appointment of its constituent members. The same section defines the duties of the Board, which are herewith given in full :—

3. On the passing of this Act the Lord President of the Council shall take steps to secure the formation of a Central Midwives Board, which shall consist of— Constitution and duties of the Central Midwives Board.

(1) Four registered medical practitioners: one to be appointed by the Royal College of Physicians of London, one by the Royal College of Surgeons of England, one by the Society of Apothecaries, and one by the Incorporated Midwives Institute; and

(2) Two persons (one of whom shall be a woman) to be appointed for terms of three years by the Lord President of the Council; and

(3) One person to be appointed for a term of three years by the Association of County Councils, one person to be appointed for a term of three years by the Queen Victoria's Jubilee Institute for Nurses, and one person to be appointed for a term of three years by the Royal British Nurses' Association.

After two years from the commencement of this Act, the members appointed under sub-section (1) shall retire, but shall be eligible for re-appointment annually. Any vacancy occurring by resignation or death shall be filled up in the case of a member appointed under sub-sections (1) and (3) by the body which appointed such person, and in the case of a member appointed under sub-section (2) by the Lord President of the Council; members appointed under sub-sections (2) and (3) shall, on the termination of the period for which they have been appointed, be eligible for reappointment for a like period.

The duties and powers of the Board shall be as follows :—

I.—To frame rules—

(*a*) regulating their own proceedings;

(*b*) regulating the issue of certificates and the conditions of admission to the roll of midwives;

(*c*) regulating the course of training and the conduct of examinations, and the remuneration of the examiners;

(*d*) regulating the admission to the roll of women already in practice as midwives at the passing of this Act;

(*e*) regulating, supervising, and restricting within due limits the practice of midwives;

(*f*) deciding the conditions under which midwives may be suspended from practice;

(*g*) Defining the particulars required to be given in any notice under Section 10 of this Act;

II.—To appoint examiners;

III.—To decide upon the places where and the times when examinations shall be held;

IV.—To publish annually a roll of midwives who have been duly certified under this Act;

V.—To decide upon the removal from the roll of the name of any midwife for disobeying the rules and regulations from time to time laid down under this Act by the Central Midwives Board, or for other misconduct, and also to decide upon the restoration to the roll of the name of any midwife so removed;

VI.—To issue and cancel certificates;

And generally to do any other act or duty which may be necessary for the due and proper carrying out of the provisions of this Act.

Rules framed under this section shall be valid only if approved by the Privy Council; and the Privy Council, before approving any such rules, shall take into consideration any representations which the General Medical Council may make with respect thereto.

The most important sections of these duties and powers are probably I. and II.

The rules (I.) framed under this section are, necessarily, an integral part of the Act. They have been framed with much skill, and will be considered subsequently.

The appointment of examiners (II.) is a matter of vital moment, since on the manner in which they carry out their functions will hinge the training and fitness of the future midwives.

Of still greater importance are the rules framed by the Central Midwives Board, and approved by the Privy Council on August 12th, 1903—I. (*a*, *b*, *c*, *d*, *e*, *f*, *g*.)

With regard to 1 (*c*), the rules require that a person presenting herself for examination with a view to obtaining a certificate (1) must have, under supervision satisfactory to the Central Midwives Board, attended and watched the progress of not fewer than twenty labours; (2) must have, to the satisfaction of the person certifying, nursed twenty lying-in women during the ten days following labour.

The certificates as to 1 and 2 must be filled up and signed by one of various officers enumerated. Generally, the certifying person would have to be a midwife approved by the Central Midwives Board.

(3) The candidate must have attended a sufficient course of instruction in the subjects named as those in which the examinations will be held. This certificate must be filled up and signed by a registered medical practitioner, recognised by the Board as a teacher.

The subjects named in this section are such that, to be adequately taught, even in an elementary manner, they will require the services of a teacher well versed in obstetrics, and prepared to take considerable pains to give the necessary theoretical and practical instruction. The selection of suitable examiners by the Board will, no doubt, be an important factor in determining the quality of the instruction.

Much will also depend on the institutions which may be recognised by the Board as possessing the necessary equipment for the instruction of midwives; on the persons recognised for filling up forms i., ii., and iii., and on the recognition by the institutions accepted of the importance of the work devolving on them.

It may be said, in general, that it is desirable to have well-equipped and fully-officered schools for midwives rather than small and dispersed institutions. Moreover, it is desirable that part of the experience required from midwives in training should be in poor households, where they may learn to

apply their teaching in the precautions required to avert sepsis, under the difficulties which they will experience when they enter on practice on their own account.

But the selection of suitable examiners, and the discrimination and thoroughness with which they carry out their important duties, probably form the key to the initiation of successful training schools. It is difficult to see how an examination such as that sketched out in the rules can be passed by persons who have not had a training as nurses.

With regard to the rules regulating the admission to the roll of women already in practice as midwives at the passing of the Act, it may be said that the precautions provided for the exclusion of unsuitable women ought to have been sufficient.

The section of these rules, however, which most vitally concerns the Local Supervising Authority is Section E—regulating, supervising, and restricting within due limits the practice of midwives.

These (1) define the general precautions required of all midwives attending cases of labour, demand and define a strict and educated cleanliness, and prescribe the materials which a midwife must take with her to cases of labour.

2. Define the duties required of a midwife to the woman in labour, whom she is attending; again deal largely with antiseptic precautions, but define the midwife's course of procedure. They lay on the midwife the responsibility of attending to serious conditions affecting the new-born child. They require also that she should instruct the mother as to her own diet and that of the child.

3. Prescribe procedures to be adopted for the protection of new-born infants.

4. Forbid a midwife to undertake the duty of laying out the dead, or to follow any occupation that is in its nature liable to be a source of infection.

5. Define the records which a midwife must keep, and the forms which she must use.

6. Enumerate the occasions when she must decline to attend alone, and must advise that a medical practitioner be sent for

(*a*) During pregnancy;

(*b*) During labour;

(*c*) In the case of lying-in women;

(*d*) In the case of the new-born infant.

7. Fix the notifications to be sent to the Supervising Authority. These include :—

(*a*) Each occasion when a doctor has been sent for.

(*b* Deaths of the mother or child occurring before the attendance of a registered medical practitioner.

(*c*) Still births.

(*d*) Puerperal fever and other infectious diseases.

These last are, in fact, included under the conditions for which a medical man must be called in.

Under Section E also occurs this important statement :

"The Supervising Authority shall make arrangements to secure a proper inspection of every midwife's case book, bag of appliances, etc., and, when thought necessary, an inspection of her place of residence, and an investigation of her mode of practice."

Midwives exercising their calling in hospitals, workhouses, or poor-law infirmaries are unaffected by Section E.

It may reasonably be asked how the requirements of Section E are to be enforced? Apparently, the only means of enforcing them is to report failures on the part of midwives to the Central Midwives Board, to enter, as it were, a black mark against them, and to keep a careful record of these reports for future use.

No one who understands the agitations, discussions, and commissions of enquiry which have been directed to the various matters brought under some measure of control by these rules can fail to be struck by the magnitude of the field of operations. When it is added that Section E has to be locally administered, it will be understood that a great, though most useful, task is placed on the local administration.

To return to the Midwives Act, the next important section from the local point of view is Section 8, which provides :—

Local supervision of Midwives

8. Every council of a county or county borough throughout England and Wales shall, on the commencement of this Act, be the local supervising authority over midwives within the area of the said county or county borough. It shall be the duty of the local supervising authority :—

(1) To exercise general supervision over all midwives practising within their area in accordance with the rules to be laid down under this Act.

(2) To investigate charges of malpractice, negligence, or misconduct on the part of any midwife practising within their area; and should a *prima facie* case be established, to report the same to the Central Midwives Board.

(3) To suspend any midwife from practice, in accordance with the rules under this Act, if such suspension appears necessary in order to prevent the spread of infection.

(4) To report at once to the said Board the name of any midwife practising in their area convicted of an offence.

(5) During the month of January of each year to supply the secretary of the Central Midwives Board with the names and addresses of all midwives who, during the preceding year, have notified their intention to practise within their area, and to keep a current copy of the roll of midwives accessible at all reasonable times for public inspection.

(6) To report at once to the Central Midwives Board the death of any midwife, or any change in the name or address of any midwife in their area, so that the necessary alteration may be made in the roll.

(7) To give due notice of the effect of the Act, so far as practicable, to persons at present using the title of midwife.

The local supervising authority may delegate, with or without any restrictions or conditions as they may think fit, any powers or duties conferred or imposed upon them by or in pursuance of this Act, to a committee appointed by them, and consisting either wholly or partly of members of the council, and the provisions of sub-sections 1 and 2 of Section 82 of the Local Government Act, 1888, shall apply to every committee appointed under this section, and to every council appointing the same, and women shall be eligible to serve on any such committees."

It will be observed that the Local Supervising Committee may consist wholly or partly of members of the Council. The duties falling under this Act were at first placed under the Sanitary Committee, and the various steps taken were considered by the Hospitals Sub-Committee.

It was, however, deemed advisable to co-opt external members having special knowledge, which rendered it necessary to appoint a Special Committee of the Council. This course, though at first view presenting some difficulties, will be found more and more to have been required as the duties imposed on the Local Supervising Authority come to be more fully understood and more completely discharged.

Section 8 places on the Local Supervising Authority the enforcement of the rules, in so far as they relate to the obligations and restrictions imposed on midwives by the rules, and especially by Section E.

Section 10, again, requires to be generally known. It runs as follows :— Notification of practice

"10 Every woman certified under this Act shall, before holding herself out as a practising midwife, or commencing to practise as a midwife in any area, give notice in writing of her intention so to do to the Local Supervising Authority, or to the body to whom for the time being the powers and duties of the Local Supervising Authority shall have been delegated under this Act, and shall give a like notice in the month of January in every year thereafter, during which she continues to practise in such area.

Such notice shall be given to the Local Supervising Authority of the area within which such woman usually resides or carries on her practise, and the like notice shall be given to every other Local Supervising Authority or delegated body within whose area such woman at any time practises or acts as a midwife, within forty-eight hours at the latest, after she commences so to practise or act.

Every such notice shall contain such particulars as may be required by the rules under this Act to secure the identification of the person giving it; and if any woman omits to give the said notices, or any of them, or knowingly or wilfully makes, or causes or procures any other person to make, any false statement in any such notice, she shall on summary conviction be liable to a fine not exceeding five pounds."

This section is necessary and sufficient to enable the Local Supervising Authority to guard against registered midwives practising in the district without supervision.

It also enables corrections to be made in the local register and on the roll of midwives, since enquiries will necessarily be instituted in reference to any midwife on the roll who fails to send in the statutory notice.

Section 1 (sub-sections 1 and 2), and Section 10 create offences, as do also Sections 11 and 12.

The offences contained in Sections 11 and 12 have reference to the procuring of false certificates, falsification of the register, and other offences of a like nature.

Any procedure required under the penal sections must be instituted by the Local Supervising Authority.

The first step taken under the Act was to form a preliminary register of practising midwives, every effort being made to render this register as complete as possible. Altogether, the names and addresses of 206 women practising as midwives were ascertained.

A report was presented to the Sanitary Committee on November 2nd, 1903, giving an account of the general scope of the Act and of the duties falling to the Local Supervising Authority, and suggestions were therein made as to the manner in which the Act should be administered.

On February 6th, 1904, the attention of midwives was directed to the Act by advertisements inserted in three Manchester papers.

On March 7th, 1904, a circular letter was prepared and subsequently sent to all persons ascertained to be in practice as midwives, in which directions were given as to the course which they should pursue with a view to registration, the necessary forms being supplied. The total number of certified midwives on the roll of the Central Midwives Board at the end of March, 1905, was 18,231. The number on the Manchester roll on June 1st, 1905, was 128.

Many visits were paid to the Public Health Office by midwives seeking advice during 1904 and the first three months of 1905.

On March 21st, 1904, the following resolution was passed at a meeting of the Hospitals Sub-Committee :—

Midwives Act, 1902.

Resolved,—

That the Sanitary Committee be recommended to appoint a Special Sub-Committee, consisting of the Hospitals Sub-Committee, four members of the medical profession—one of whom should, if possible, be a qualified lady,—to deal with the Midwives Act, 1902.

That the Chairman and Deputy-Chairman of this Sub-Committee, Dr. Chapman, together with the Medical Officer of Health, be appointed a Special Sub-Committee to recommend to the Sanitary Committee the manner in which the four members of the medical profession should be chosen.

Subsequently, however, it was pointed out by the Town Clerk that if members were co-opted a separate committee would require to be appointed.

Accordingly, at a meeting of the City Council on August 3rd, a Special Committee was appointed, to be named the Midwives Supervising Committee, consisting of the members of the Hospitals Sub-Committee and of four co-opted members—Dr. Arnold Lea, Dr. E. Annacker, Dr. F. C. Scotson, and Dr. M. Bell.

The first general meeting of this Committee was held on September 19th. Dr. Chapman was elected chairman. A report (prepared by the Medical Officer of Health) on the scope and requirements of the Midwives Act, together with a list of duties of the officer who would be needed to carry on the work of the Committee, having been presented, a Special Sub-Committee was appointed to consider these papers, consisting of the medical members of the Committee.

This Special Sub-Committee met on October 10th, and recommended as follows : —

1. That an advertisement be issued for the services of a qualified Medical Practitioner to act under the supervision of the Medical Officer of Health, the whole of whose time must be given to the duties falling to the Corporation to discharge under the Act.

2. That the Officer appointed be required to possess a special knowledge of Obstetrics, and be, by preference, a Diplomate in Public Health.

3. That the salary offered be £250 per annum.

The outline of duties of the officer to be appointed may usefully be recorded, as it serves, however insufficiently, to give an idea of the great range of work which it will fall on the Committee ultimately to carry out :—

Provisional Statement of Duties of the Executive Officer under the Midwives Act, 1902.

To visit midwives, both systematically and irregularly, and see that their homes are kept in a sanitary condition.

To inspect their case or bag of instruments.

To ascertain that they have a supply of soap, antiseptics, and antiseptic lubricants.

To inspect their case books, and ascertain that they are properly kept.

To ascertain that they are suitably provided in washable dresses.

To ascertain that they understand the use of antiseptics, and the antiseptic precautions which they are required to adopt.

To ascertain that they have entered in a book any treatment by drug which they may have considered necessary,

To inspect the record of those instances in which they have called in practitioners.

To ascertain that in all the cases prescribed by the regulations a midwife has declined to attend alone, and has advised sending for a registered medical practitioner.

To take charge of the notifications of deaths, still-births, and puerperal fever, and to carry out any action which the Committee or the Medical Officer of Health may consider to be called for in connection with such notifications, with the assistance of the Registrars of Cemeteries, to ascertain that notification of still-births is properly carried out. He may be required to make post-mortem examinations.

To visit the cases attended by midwives, and see that the requisite procedures are carried out, and that strict cleanliness in all things is observed.

To ascertain that suitable provision is made for the dieting of mother and child.

To ascertain that all the duties of the midwife to mother and child as prescribed by the regulations are properly carried out.

To see that all necessary precautions are taken by the midwife when a case of puerperal fever occurs.

To report any offences against Section 1 (sub-sections 1 and 2), Section 1 (sub-section 4), Section 1 (sub-section 5), Sections 10, 11, 12, and 13.

Generally, the Executive Officer will be required to exercise supervision over midwives in all matters relating to Section E of the regulations.

The officer will be required to keep a book, in which all visits, and any action taken, will be recorded.

At the next meeting, on December 16th, a letter was read from the Manchester Medical Guild to the effect that a minimum fee of £1 1s. 0d. ought to be paid by the Local Supervising Authority to medical men called in by midwives to attend at confinements in cases where the Act compels the midwife to summon medical aid. The consideration of this letter was deferred.

An advertisement having been inserted in the medical press inviting applications for the position of Executive Officer under the Midwives Acts 1902, and applications having been received, five candidates were selected.

At a meeting held on December 22nd, the selected candidates having been interviewed, Dr. Margaret Merry Smith was recommended for appointment, and the appointment was definitely made by the City Council on January 4th.

To the Special Sub-Committee was also assigned the duty of preparing instructions to midwives explanatory of the rules, and giving greater precision of direction where this might appear desirable, also of preparing instructions in the care and feeding of children during the first 10 days of life. It was not considered necessary to give instructions in the feeding of mothers—at all events at once.

The instructions to midwives, which had received repeated and careful consideration at the hands of the Special Sub-Committee, were submitted and approved at a general meeting of the Committee on February 23rd, while those relating to infant tendance were approved at a subsequent date.

Copies of these memoranda may be had on application.

From the commencement of their work the Committee have dealt in detail with a large number of cases of Puerperal Fever, which came sometimes from unexpected quarters. They have given the most careful and considerate attention to these, while recognising that in order to attain the objects of the Act a measure of severity was necessary. In the result, it appears certain that there has, already, been great improvement.

This cannot well be mere appearance, since no death of a woman at child-bearing age is allowed to pass without special enquiry.

The work done by the Midwives Supervising Committee, however, scarcely belongs to the year 1904, and a full report will be presented next year of what has actually been accomplished.

Meantime, several points of cardinal importance have presented themselves.

1. How are medical practitioners to be paid when sent for by midwives under the Act? So numerous are the occasions mentioned under the Act on which midwives are advised to send for medical men that, if it is contemplated that payment should be made, it should be limited to cases of confinement. In any case, payment should be only in well-defined cases.

If payment is to be made out of local funds, it is better that it should be by the Local Supervising Authority than by the Board of Guardians, since they have the means of supervising the occasions which call for it.

Payment, however, should be restricted to those instances in which it would be too heavy a tax on the family to pay for assistance. It is easy enough to fix a scale for payments; but it is not so easy to ascertain whether a family is or is not capable of defraying the cost of assistance, as defined by such a scale. In this respect the Poor Law Guardians have the advantage.

Another difficulty consists in the choice of medical practitioners to be called in. Clearly it would not be advisable to leave this to the midwife. The Local Supervising Authority or the Board of Guardians would have to select their own officers. Here, again, the advantage is on the side of the Poor Law Administration.

The advantages, however, in administration of the Act are so clearly on the side of any payment made being made by the Local Supervising Authority that one would hesitate long before handing the payment of fees over to the Poor Law Authorities.

The question of the appointment of medical men amongst practitioners in different districts is by no means an easy one. The subject is, however, one which must soon engage the attention of the Committee.

Assuming, however, for the moment, that it is possible to ascertain accurately the income of families in which assistance is requested, there are other conceivable ways in which the difficulties might be surmounted by the Supervising Authority.

One of these is to appoint one or two young medical practitioners who have had experience in Lying-in Hospitals, and to place at their disposal a motor car, to be ready at all hours. The officer or officers might be put in communication with the police telephones, and the midwives could easily be informed of the arrangements.

Possibly this would be the cheapest way of doing the work effectually and satisfactorily.

It is probable that fresh legislation in this matter will be required.

If so, powers should be obtained to secure an accurate declaration of the income and necessary expenditure of a family seeking assistance, under a penalty for any misrepresentation of a substantial nature.

2. In any further legislation the term Puerperal Fever should be defined either by the Local Government Board or by Act of Parliament

As things stand at present, there is one law for midwives and another for medical men who have, and very properly have, control over them.

But the injustice of existing conditions is deeply felt.

On what appear to me, at all events, inadequate grounds, a medical man may declare that he does not regard a fatal illness involving the pelvic organs, and following directly on labour, as a case of Puerperal Fever.

3. Three months of practical training is totally insufficient to turn an ordinarily clever woman into a suitable person to practice midwifery.

Illiteracy should be an entire bar to the admission of future midwives on the roll.

At no distant time it is to be hoped that only nurses who have had a complete training will be admitted to the examination.

On the manner in which the examinations of the Central Midwives Board are conducted hinges most of the usefulness of the Act in the future.

4. For the same reason, the fitness of institutions selected as suitable schools for midwives, especially as regards the personnel of their teaching staff, and their equipment for instruction, should receive the most anxious consideration from the Board

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In conclusion, the Act is one which should lead to the most beneficent results, if considerately but resolutely enforced.

The Manchester Supervising Committee is clear in its purpose to derive the utmost benefit from it, and has not grudged the heavy labour already involved.

It is fortunate in its choice of Executive Officer.

The by no means inconsiderable clerical work has been skilfully done by Mr. Dunks.

We may, I think, look forward hopefully to a steady advance in the care for poor women in labour, who have had to suffer so much in the past from ignorance and from want of supervision of midwives.

WORK OF THE LADIES' PUBLIC HEALTH SOCIETY AND THE LADIES' SOCIETY FOR VISITING THE JEWISH POOR.

The table on page 292 shows the amount of work these Societies have done during the year 1904.

The work performed by these Societies for a number of years in teaching personal and household cleanliness in the poorer districts of the City has had a marked effect in these districts, and an improvement on former conditions can now generally be discerned. The Medical Officer of Health desires to acknowledge the valuable services rendered by the Lady Officers and District Lady Superintendents of the Societies in guiding and aiding the work of the Female Health Visitors.

A summary of the work done by the Health Visitors under the supervision of the Ladies' Public Health Society and of the Medical Officer of Health is given in the following table:—

Work of Female Health Visitors, Year ending 31st December, 1904.

(*a*) Ladies' Public Health Society.

DISTRICT	Number of Cottages in District	Houses Visited		Condition of Houses							No. of Houses containing Lodgers	Complaints requiring action by Sanitary Department	Sickness			Leaflets left at Houses	Disinfecting Powder left at Houses	Limewashing								Reports as to Children being Neglected (clothing, food, &c.)	Help Rendered	Death Cards	Average Death-rate, 1900-1-2
		First Visit	Not First	Dilapidated	Not Dilapidated	Clean	Dirty	Improved since last Visit	Not Improved	Overcrowded			Infectious	Non-Infectious	Total Sickness			Living and Bed Rooms	Kitchens	Yards	Closets	Cellars	Coal-places	Ceilings	Staircases		Help rendered includes :—Giving food, clothing, &c., advising mothers as to care and treatment of children, making of sick beds, cleaning houses for sick persons, obtaining recommends for Convalescents, &c.		
1. Ancoats, West	1434	...	720	31	689	648	72	322	398	6	93	52	7	171	178	716	720	103	22	47	47	3	2	128	8	...	61	114	32·5
2. Ancoats, North	2137	...	1248	8	1240	1183	65	126	1122	2	220	6	9	144	153	957	1216	82	35	53	54	3	13	92	18	8	112	129	29·1
3. Ancoats, Central	1021	...	1156	8	1148	1101	55	312	844	2	46	11	63	313	376	987	1136	101	72	90	90	10	19	96	28	10	213	83	32·7
4. Ancoats, South	1398	...	646	12	634	441	205	154	492	9	78	36	12	125	137	695	639	41	99	117	116	9	54	52	22	16	110	130	24·5
5. Ancoats, East	1166	...	893	46	847	713	180	209	684	5	189	46	61	142	203	999	893	56	39	68	68	3	25	75	40	1	248	66	24·3
6. London Road	1820	...	1059	92	967	973	86	466	593	1	103	52	17	220	237	1600	918	261	65	219	218	38	49	223	39	3	165	136	27·7
7. Deansgate	1705	...	1202	12	1190	839	363	306	896	9	320	54	28	404	432	1264	990	190	86	98	98	18	70	86	64	3	283	136	34·6
8. St. George's, North	3052	...	721	1	720	711	10	155	566	...	86	10	8	26	34	557	710	16	31	31	32	6	5	18	3	2	176	153	...
9. St. George's, East	1421	162	817	17	962	960	19	143	694	1	101	38	7	44	51	978	977	12	55	27	35	6	1	8	2	3	49	152	...
10. St. George's, Central	1422	...	707	88	619	637	70	58	649	24	165	83	11	113	124	662	584	148	43	51	54	3	...	149	52	10	157	56	...
11. Angel Meadow	1023	282	148	19	411	390	40	18	130	...	186	13	1	27	28	387	274	9	...	1	2	3	...	1	1	...	38	46	46·6
12. Chorlton-upon-Medlock, North	1808	...	1062	2	1060	1041	21	297	765	..	165	15	17	125	142	1581	952	78	65	116	120	32	16	64	11	...	395	131	...
13. Chorlton-upon-Medlock, South	893	471	529	5	995	948	52	129	400	2	173	37	22	98	120	1708	930	32	66	89	87	32	1	61	2	3	97	131	...
14. Hulme, West	830	26	451	23	454	392	85	23	428	2	83	8	22	93	115	370	275	48	54	67	66	3	...	8	4	2	329	68	...
15. Hulme, Central	3288	317	51	...	368	360	8	20	25	1	130	7	2	31	33	365	245	36	22	55	58	24	11	14	3	1	91	137	...
16. Hulme, East	1134	...	1364	49	1315	1094	270	69	1295	2	355	26	17	320	337	1326	294	62	35	54	56	8	...	92	3	39	439	76	...
Total	25552	1258	12774	413	13619	12431	1601	2793	9981	66	2493	494	304	2396	2700	15158	11759	1275	789	1183	1201	201	266	1167	300	107	2963	1744	..
(*b*) Ladies' Society for Visiting the Jewish Poor.																													
17. Red Bank	657	42	1174	2	1214	1205	11	146	1028	...	167	58	6	164	170	1029	1029	70	60	9	2	4	...	73	5	1	116	...	16·1
18. Strangeways	394	...	785	14	771	701	84	56	729	...	453	134	10	93	103	1015	785	9	18	39	38	4	...	9	...	...	54	...	...
Total	1051	42	1959	16	1985	1906	95	202	1757	...	620	192	16	257	273	2044	1814	79	78	48	40	8	...	82	5	1	170	...	...
Grand Total	26603	1300	14733	429	15604	14337	1696	2995	11738	66	3113	686	320	2653	2973	17202	13573	1354	867	1231	1241	209	266	1249	305	108	3133	1744	...

From the above table it will be seen that the Health Visitors have made 16,033 inspections of houses during the year in the course of systematic house-to-house visitation in their respective districts. They have also made 1,744 special enquiries in cases of death, and have laid 752 complaints as to insanitary conditions which they have detected in the course of their daily work.

They have distributed no fewer than 17,202 leaflets on the following matters :—

1. The Prevention of Diarrhœa.
2. The Prevention of Consumption.
3. Precautions against Measles.
4. Precautions against Whooping Cough.
5. Suggestions to Householders.
6. How Infants should be Fed, etc.

By the distribution of the leaflets and by personal instruction a system of educational work is constantly going on amongst the poor.

Disinfecting powder has been left at 13,573 houses.

The importance of cleanliness of the houses and person is steadily inculcated.

Limewashing.—The Visitors' supply brushes on loan, and give the necessary sanitary dry lime to tenants of houses who will undertake cleansing. During the year they have been enabled to get 6,722 rooms, yards, closets, etc., thoroughly cleansed and limewashed. To this portion of their work the Medical Officer of Health attaches great importance.

In the course of their daily visits they came across 108 cases of neglected children. The parents were warned in many instances, and others were reported to the Society for the Prevention of Cruelty to Children.

Help was rendered to 3,133 families in many ways, such as in food and clothing, advising mothers as to the management of their children, making the beds of sick patients and cleaning their houses, obtaining recommends for Convalescent Homes, and in the summer months arranging to send children into the country for a holiday, and to the Manchester Camps at Birkdale and St. Annes for Poor Children at the Seaside.

During the year they have been engaged in another very important work, viz, supervising the disinfection of houses in cases of Consumption, and seeing to their subsequent cleansing, and with some exceptions this work is carried out to my entire satisfaction. At the end of the year they had 371 cases of Consumption under observation in their respective districts. It is their duty to report monthly as to whether the house is clean and free from dust and

dirt, and every three months they see that a thorough cleansing of the house takes place, so as to keep down infective material as much as possible, viz. : the walls are rubbed down with dough, the floors and furniture washed, and the bed clothing and personal clothing of the patient washed in boiling water.

I attach, also, very great importance to the work which the Health Visitors are doing in the instruction of mothers in the procedures which they must adopt when artificially feeding their children.

They have received special practical training in the methods and precautions required in the preparation of foods and in the feeding of infants; and I hope that, in this way, the assistance given to mothers unable to suckle their children has been rendered much more valuable.

It is probable that if some specially qualified lady were appointed to supervise their work, to train them, and to give instructions on behalf of the Health Office, their services would be rendered much more valuable.

To fill such a post satisfactorily the lady chosen would require to have received a suitable education, to have qualified as a sanitary inspector, and, if possible, also, to have had training as a nurse.

MONSALL HOSPITAL.

Medical Superintendent's Report.

General Observations.

I submit the usual tables showing, in statistical form, the details of the work done in Monsall Hospital during the year 1904.

It is, however, necessary to emphasise the fact that, in making any comparison with the results of other hospitals, the statistical method is fallacious on account of the smallness of the numbers with which we have to deal. There are so many factors, which cannot be recorded in statistical form, which may have influenced the results to a greater or less extent. The chief of these is, perhaps, the severity of the cases upon their admission to hospital. This varies, not only with the length of time which has elapsed between the onset of the disease and the patient's admission to hospital, but with the social condition, state of nutrition, and the constitution of the patient himself, and the nature of the epidemic of which his case forms a

part. All of these affect the statistics, in my opinion, to a greater extent than the variations in the methods of treatment that occur from time to time, and here the only criterion available, namely, the individual opinion of the medical observer, though open to obvious fallacies, is less inaccurate than the statistical method.

I shall, therefore, throughout this report refer but briefly to the tables dealing with disease, and shall mention rather the results of the observations of the medical staff who have been in contact with the patients.

It is, I think, necessary to point out that a modern isolation hospital should be not only a receptive institution but also a curative one; furthermore, the process of cure should not stop short at the individual patient. It is imperative that, when this has been attended to (and it is, of course, the most important of our duties), some attempt should be made to contribute to the common stock of knowledge of the diseases with which we come in contact. This again is not merely a question of teaching classes of students, but of recording results in the medical press and elsewhere, and of engaging, as far as possible, in any research which the staff of fever hospitals alone have the opportunity of doing. None of these things can be recorded as profit and loss in an annual report, but they are none the less important on that account.

The importance of this side of the work has in the last year been recognised by the Hospitals Sub-Committee in their provision of a laboratory with every appliance for microscopical research, and it would be difficult, to my mind, to overestimate the advantage that this has been to us. Not only has it simplified and rendered more accurate the clinical diagnosis in the wards, but it has enabled us to follow up with much greater completeness the nature of any illness on which clinical observation alone has not shed as much light as we could have wished.

Speaking generally, the work of the Hospital this year has been more surgical in its nature, and I think that further development in the treatment of infectious disease will proceed on these—hitherto, somewhat neglected—lines. This would not have been possible did we not possess an operating theatre—itself somewhat of an innovation in a fever hospital. We are, I think, bound, not only to free our patients from infection, but also to cure them of the other results of the disease for which they were admitted; and it is, in my opinion, not justifiable to discharge a patient from a fever hospital with a complication requiring surgical treatment with directions that he shall go elsewhere to obtain this, unless one can be quite sure that the disease will not progress in the interval—and certainty on this point is often impossible. Given the appliances, and a staff which can be trained to observe the necessary cleanliness, it is as safe to operate in a fever hospital as it is in

a general institution or in a private house. The results of the operations that have been performed at Monsall have been very satisfactory, and there are indications that they will be more convincing still when cases of puerperal fever, erysipelas, and enteric fever are admitted earlier in the course of the disease than they are at present. This again will occur when isolation hospitals are recognised by the medical profession and the general public as the first, and not the last, resort in these cases.

While the daily average of the patients is slightly less than last year, there has been a diminution in the general mortality and also of each disease separately. I am inclined to attribute this to the increased precautions for ensuring asepsis in the treatment of the more serious cases, and this again is probably due to the fact that the general level of intelligence of the nursing staff is higher than it used to be. We have, it is true, more return cases this year, and one would at first sight expect that the same improvement would be manifested in that case also, but I shall refer to this matter later.

Unfortunately, we do not see in hospitals generally a similar improvement in the domestic staff. The "servant problem" is as far from solution inside the walls of a hospital as it is in the home. Whatever be the cause, the intellectual level of the average ward maid appears to me to be steadily deteriorating. I imagine that the main reason for this is that domestic service is a profession which is taken up for no reason of its own, but because the applicant for employment has been dissatisfied with her last occupation. There is, therefore, no reason why the individual should take any interest in her work; in practice she does not, and it is almost impossible to get the maids, as a class, to see that the way in which the work is done has an effect on the well-being of the patients. Then, too, there is little doubt that nowadays girls are trained but slightly in the ordinary work of the house by their mothers, who themselves know less about domestic economy than their parents did. Whatever be the cause, it is necessary that much work which really should be done by the maids, has to fall to the lot of the junior nurses. A certain amount of this is not a bad thing, but it may easily be overdone. Too high a proportion of work, the result of which is not obviously visible to the worker, is bad, and I should, at Monsall, be glad to see the amount of actual ward cleansing that is done by the nurses reduced, but I can see no possibility of this.

The discipline and health of the staff have been excellent. Three nurses have contracted scarlet fever, five diphtheria, and three enteric fever: all have recovered completely. There has been the usual proportion of minor ailments. I may say that at Monsall a rigid medical examination of each candidate for the post of probationer nurse is made before she is allowed to commence duty.

But few structural alterations have been made in the hospital. A shed has been constructed for the use of visitors to the patients on Saturdays, which has been very useful, and four more wards have been fitted with a satisfactory heating apparatus. It was also found necessary to fill up the intervals between the laths in the walls of the convalescent wards with wooden strips, and it is now possible to keep these wards at a satisfactory temperature.

Several of the wards and other buildings have been repainted by the workmen belonging to the Corporation, under the direction of the Town Hall Steward (Mr. Rison), and in this, as well as in other work executed by him, the advantages over the former method of employing contractors have been most marked. It is, moreover, evident that this course will be found ultimately to be the cheapest, though the initial outlay was slightly higher. Again, in a hospital such as this, insufficiently impervious paint may result in the infection of a patient, and bad workmanship or inferior materials in the construction or repairing of buildings may endanger the health or even the lives of the inmates. In plumbing, especially, contract work is apt to be unreliable.

SCARLET FEVER.

The number of admissions is slightly less than last year, while the mortality is the lowest yet recorded in this hospital. On account of the large number of admissions in the case of scarlet fever as compared with diphtheria and enteric fever, and also because the patients are admitted, as a rule, early in the course of the disease (this again being due to the fact that there is usually a more or less obvious eruption which attracts the attention of the parents), there is a greater probability that the statistics may have been influenced by some recent alterations in the method of treatment of the more serious cases.

Whether this be so or not, I am strongly of opinion that our best hope of saving the severe cases lies in the use of a bactericidal serum. This has been given more freely this year at Monsall, and the results have been very encouraging, some cases having recovered that were in an apparently hopeless condition. In other severe cases, the results may have been due to earlier and more extensive surgical "interference," which appears to me to be the natural outcome of our increased knowledge of the pathology of the disease.

The average duration of the scarlatinal patient's stay in hospital is practically the same as it was last year, but, as I pointed out then, this "average stay" is an arithmetical and not a clinical expression. In practice, its only value is to serve as a basis for financial calculations. As a matter of fact, a patient

with a moderately severe attack of scarlet fever usually leaves hospital at the end of about six weeks, during four of which he is in good health, though still in all probability capable of spreading infection to others. Of the whole period, about four weeks are spent in the acute wards and a fortnight in the wooden pavilions, where the patient does not come in contact with cases of acute disease.

On comparing the table of complications with that for 1903, it will be seen that there is a rise in the incidence of discharge from the ears (20·9 for 1903) and nose (8·7). So marked a change as this calls for some comment.

In the first place, a diminished mortality generally means a higher rate of complications, for the reason that cases which have formerly died have recovered, and developed the complications to which severe cases are more particularly liable.

But in this case a more potent factor has been at work, namely, more accurate observation and recording. This again is due to the fact that it has recently been our practice to investigate all discharges from the nose or ears bacteriologically, and this implies increased vigilance on the part of the nurses. It is probable that, hitherto, some cases where the discharge has been very slight, or has lasted only for a day or two, have escaped notice.

Discharge from the ears is a disease which has a very important bearing upon the after-life of the patient who suffers from it during an attack of scarlet fever—that is to say, if it persists, as it frequently does, in spite of palliative treatment. Hitherto it has been the practice here, as in most fever hospitals, after a varying time—which may perhaps be approximately stated at two or three months—spent in treatment by syringing the ear with various lotions, to dismiss the patient while the discharge is still present, with the advice that his relatives should consult a doctor or go to a general hospital for further treatment when he arrives home. The advice, however, is seldom followed, for the reason that the parents cannot see that there can be any danger in a discharge from the ear, and, especially in this part of the country, people will not believe what they cannot see for themselves.

But a patient with a chronic discharge from the ear does in reality live in considerable risk of his life : a blow on the ear, or a slight cold, or some other trivial occurrence, may give rise to inflammation of the brain, and the onset of this is sudden, and cannot be foreseen. That this danger is not a fancied one is shown by the fact that insurance companies will not accept the life of a man who is subject to a chronic ear discharge. In addition, he is, by virtue of this discharge, ineligible for employment in any public service, and also frequently suffers, in a greater or less degree, from deafness.

The surgery of the ear has recently made considerable strides, and it is now possible, in the great majority of cases, to arrest the discharge and remove the risk of subsequent inflammation of the brain by operative treatment, and I am strongly of opinion that, with the consent of the relatives, every patient who develops a discharge from the ear should be operated upon for its cure, if medical treatment fails to effect this, before he is discharged from the hospital. At Monsall a number of these operations have been performed, and the results have been very encouraging. Moreover, in every case improvement in hearing has resulted.

I have dwelt upon this point, as it is one of the reasons why the amount of work done by the medical staff of a fever hospital tends to increase in amount as time, with the fresh discoveries in surgery, goes on, and also why it does not, as it is sometimes expected to do, diminish when the number of patients decreases. But here again the results cannot be made to form part of a mathematical statement, or be recorded as financial gain.

The further reduction in the incidence of nephritis is gratifying, and is, probably, as far as it goes (for the nnmbers are but few), additional evidence of the origin of this complication by infection from the throat. We should expect its incidence then to be diminished with the further perfecting of the precautions to ensure adequate cleansing or disinfection of the fauces in the acute stage of the disease.

The term nephritis, for statistical purposes, includes only those cases in which blood was present in the urine, while by "albuminuria" is meant those in which albumen was present in appreciable and constant amount for more than a week. Clinically, this division is inaccurate, as some of the latter class are cases of true nephritis. Faint traces of albumen in the urine, of irregular duration, apart from any signs of disease clinically, do not appear in this table, though they are observed, and recorded, in the wards.

There occurred in the hospital seven cases only of post scarlatinal diphtheria, being an incidence of only ·44 per cent. I attribute this chiefly to the fact that by the substitution of a douche for the syringe in the cleansing of the throats, and by the use of rubber gloves by the nurses during the necessary manipulations, risk of infection of a patient in the process of treatment is rendered almost impossible. The cases that have occurred have been almost without exception in the convalescent wards, where, owing to the porous nature of the wooden floors and walls, and to the fact that the children being at this stage bodily well are in more intimate contact with each other and with the floor, it is more difficult to ensure surgical cleanliness in the surroundings of the patient than it is in the acute wards.

ENTERIC FEVER.

In the case of enteric fever, the numbers are much too few to draw any conclusions from the statistics with accuracy. As far as they go, the death-rate and incidence of the chief complications are very satisfactory.

I may say that the practice at this hospital may be summed up in the following points :—

Cold baths are employed in all the severe cases—were the number of available staff greater, they would be used more frequently.

Very few drugs are given. Stimulants are avoided as far as possible, and so called intestinal antiseptics altogether : in my opinion, both of these usually increase rather than diminish the rate of intestinal peristalsis, and are therefore contra-indicated.

Great attention is paid to the cleansing of the mouths, and, whenever possible, patients are fed on carefully-prepared solid food in the acute stage. This procedure has not only shortened the period of convalescence, but has diminished the incidence of complications, notably relapse, and perforation of the intestine.

I have found that there are very few patients who can digest an exclusively milk diet for more than a week at a time, and many cannot digest it at all. It is, I think, to be regretted that the impression still prevails to so large an extent that a patient with enteric fever should be fed on milk only during the whole period of the pyrexial stage, and sometimes for some time after. Certainly this does not accord with the experience of those physicians who see many cases of enteric fever.

It will be noted that six deaths, or one-fifth of the total, occurred within 48 hours of admission, and could, therefore, hardly be called hospital cases. It is greatly to be regretted that in Manchester, as in most cities where there is a large isolation hospital, cases of enteric fever are habitually notified so late in the course of the disease. Delirium, and impending death, appear to be the chief, and sometimes apparently the only indications for notification.

I have added, this year, tables showing the day of disease on which the patient was admitted, and also the interval elapsing between the date when a medical man was alleged to have been first called in and that of the patient's admission to hospital. It will be seen that two-thirds of all our cases are admitted after the tenth day of disease, and about the same proportion obtains if the fatal cases only are taken.

It is also remarkable that in so high a percentage as one-third of all cases an interval of over ten days elapsed between the date when the medical man first saw the patient and that of the notification of the case. In very few cases—only about six altogether—was a trained nurse employed before the patient was removed to hospital. To treat a case of enteric fever without adequate nursing is, in my opinion, simply to court disaster.

DIPHTHERIA.

It would appear from the tables that there has been a slight gain this year, for the general death-rate has fallen by 2 per cent., and that of cases requiring tracheotomy by 20 per cent.

But this is, I think, simply due to the fact that we have had the cases this year somewhat earlier in the course of the disease. It will be seen that last year no fewer than 167 were admitted on and after the seventh day of disease, whilst this year the corresponding number was 56. Moreover, the number of patients dying within 48 hours of admission was lower, and this has affected the tracheotomy statistics table more particularly, five having been admitted in a moribund condition this year, as against 12 last year. In the case of diphtheria, the period of the disease in which antitoxic serum is given is a factor of predominating importance. Moreover, this year, quite an appreciable number of patients had had antitoxin administered before admission.

It is to be wished, however, that a further improvement in this respect would take place. It happens, unfortunately, that some of those practitioners who send us the largest number of cases are not in the habit of administering this remedy when the patient is first seen by them; moreover, they do not, as a rule, at once notify him for removal to hospital.

It is possible, also, to make a little financial calculation on this point. If a case comes into hospital, say, at any time in the first three days of the disease, the cost of the amount of serum necessary, though it varies somewhat with the nature of the illness, may be stated at about four shillings. When, however, a case of the same severity is not seen until the seventh day, the cost of the large dose, which it is then necessary to give in order to compensate for the failure to administer the early smaller dose, is about twenty shillings.

But by far the more common cause of delay is the failure of the parents to notice the initial symptoms of the disease, or to call in a doctor when they have noticed them.

I have shown in a separate table a few cases that were sent into hospital because bacilli (resembling diphtheria bacilli) were found in their nasal discharges, when careful observation, clinically, failed to show any sign of diphtheria. These children were in more or less robust health, but I feel convinced that it is necessary to isolate any such case until the discharge is cured and does not contain these bacilli on culture. Cases in which bacilli indistinguishable morphologically from those of diphtheria were found after the admission of the patient are not included in this table.

Though I believe, personally, that the greater number of these organisms are not diphtheria bacilli at all, I feel sure that some of them are, and if they are not at the time in that particular patient virulent, they may and do become so, if they reach the throat of another patient. It is necessary, in my opinion, to isolate the patients who harbour them, and, except sometimes in the ear, where they cannot be got at easily with disinfectant fluids, they usually disappear rather quickly under local treatment alone. An attempt has been made elsewhere, this year, to distinguish the true diphtheria bacillus by its microscopical and cultural characteristics from these "pseudo-diphtheria" bacilli, but I cannot, as yet, admit the feasibility of this in practice.

It will be noted that tracheotomy is the only operation mentioned in the tables as having been performed for the relief of laryngeal obstruction, and, as a matter of fact, the alternative—intubation of the larynx—is seldom performed at Monsall. In America, and on the Continent, and in some hospitals in this country, it is preferred as a routine operation to tracheotomy. The chief reason why it is seldom resorted to here is that almost all of the cases are suffering from secondary implication of the larynx, and are admitted late in the course of the disease. While incubation may be, and in fact is, the best operation for early cases of primary laryngeal diphtheria, the partial relief which it gives is not sufficient when the patient has a failing heart, and the fauces are covered with membrane. In America a lower death-rate is recorded after intubation than in this country after tracheotomy, but, in my opinion, the main reason for this is that antitoxin is, in most cities in America, administered early in the course of the disease by the Public Health Department not only to the patient certified, but also to all who have been in contact with the patient, whether he is removed to hospital or not.

OTHER DISEASES.

The annexed table shows the nature of the disease in cases where the hospital diagnosis differed from that of the certifying medical man. It is to be remembered that in many, in fact in most, the nature of the disease was not apparent until some time spent in observation of the patient in an isolation ward had elapsed. Very frequently, in the case of infectious disease, it is not possible to make an accurate diagnosis until the patient has been under observation for some days. This is not possible in the home of the patient in many instances, nor is it right that notification should be delayed in order that it may be attempted. The diagnosis of scarlet fever, in particular, is often extremely difficult.

At Monsall, no patient is admitted to a scarlet fever ward unless it is possible to say from our own observation that the patient is undoubtedly suffering from scarlet fever. Consequently, it is only rarely that that disease is contracted after admission. Before a patient is declared not to have suffered from scarlet fever, he spends a period of at least three weeks under careful daily observation in an isolation ward. In the cases described as having no obvious disease, it is probable that before the patient's admission he had had a trivial ailment, possibly accompanied by a faint and fleeting eruption of no special significance, but which at the time looked somewhat like the rash of scarlet fever.

PUERPERAL FEVER.

Only 16 cases of puerperal fever were admitted during 1904, and, of these, eight recovered.

The cases that are admitted to Monsall have been attended in the first instance, almost without exception, by a "midwife," medical assistance not having, as a rule, been summoned until the third or fourth day of the illness, which in itself has come on at a variable time of the confinement.

The condition of the majority of the patients has been pitiable in the extreme; they have seldom been notified for removal to hospital until they were either in a condition of unmanageable delirium or impending death. It is difficult to exaggerate the harm that these midwives have done. As a rule, they are entirely without training, and it would appear that, in many cases, their sole qualification for employment is their having attended the confinement of a neighbour of the patient.

Fortunately, there is now some probability that the death-dealing operations of these uncleanly women will be restricted by the working of the Midwives' Act, and it is to be hoped that the attention which the coming into force of this Act will call to the nature of puerperal infection will result in the earlier notification and removal to hospital of the patients. This is especially necessary, as operative treatment, which can seldom be carried out in their private houses, is usually called for.

Moreover, there is reason to believe that the administration of a bactericidal serum is an advantage if the case is seen sufficiently early.

Taking into consideration the gravity of the disease, and the stage which it has reached without adequate treatment on removal to hospital of these patients, the results of the treatment have been, in my opinion, very gratifying.

Unfortunately, however, in this disease, even if the patient recovers under treatment, a condition of chronic invalidism frequently results.

ERYSIPELAS.

The term "erysipelas" is a relic of the days when it was thought to be a specific disease. Now the more general opinion is that it does not differ materially in nature from other forms of septic infection of wounds and from such complications as cellulitis and glandular abscesses.

At Monsall, while the majority of the patients have suffered from facial erysipelas—usually due to inoculation with septic matter through the nose—many of the cases have been admitted with various kinds of septic wounds, in some of which the disease had already advanced to a state of general septicæmia. This most serious complication has usually been the result of the neglect of a trivial wound in an alcoholic or debilitated subject.

The results of treatment have, however, been satisfactory; in the majority prompt and even extensive surgical "interference" has been necessary.

The most noticeable point has perhaps been the influence of the patient's previous constitution and habits. In children or young healthy adults some very severe illnesses have ended in complete recovery, while in the prematurely aged or the drunken an apparently trivial injury has resulted in death.

RETURN CASES.

It will be noted that the number of "return cases" is somewhat higher this year than last. It will be necessary, therefore, to make some comment on this fact, especially as the existence of return cases at all has been brought forward as a reason for the abolition of the hospital isolation, or, as I prefer to call it, hospital treatment, of scarlet fever altogether. In the heat of these discussions in the medical press, a tendency has been evident to minimise the importance of the curative side of the work of the hospital and to treat the subject entirely from the statistical point of view.

It is not always easy to say what constitutes a return case, but I have taken in this connection all those in which infection from a patient previously discharged from Monsall was possible—a list of these has been sent me by the Medical Officer of Health.

It should be noted, however, in comparing the Manchester figures with those of other cities that in some localities cases occurring after an interval of one month from the discharge of the first case are not counted as return cases at all. This interval was exceeded in eighteen per cent. of our cases. I think it better to include all cases.

However, there remains the fact that patients have been discharged from this hospital in an infectious condition. The main reason for this is that we have in scarlet fever no accurate knowledge of its pathology, and it is not possible to say when a patient is free from infection—we can only surmise. In the case of diphtheria, where the cause of the disease can be seen under the microscope, return cases but seldom occur.

I believe, with Dr. Niven, that, in the later stages of scarlet fever, a patient is extrinsically as well as intrinsically infectious—that is to say, he has his own infection to deal with, and also his nasal passages and ears act as incubators for the infection discharged into the air from other patients. Whatever scarlet fever may be in theory, in practice it is a mixed infection, and any one case may be, and probably is, at any time infectious to any other in the same ward. We, however, at Monsall, separate the convalescent from the acute cases. For the first month or thereabouts the patient is in an acute ward, which itself is built of substantial impervious materials, and comparatively easy to clean, and he is supervised there by well-trained sisters, and his movements are limited. Moreover, he cannot infect the furniture or walls or floors of these wards to any great or lasting extent. He then receives a bath, his nose, throat, and ears are thoroughly douched with an antiseptic, his clothing is disinfected, and he is sent up to a totally different part of the hospital for the remainder of his stay. Here, however, the conditions are not so favourable. While there is no overcrowding in the usually accepted sense of the word—for every patient receives at least 1,500 and more often 2,000 cubic feet of space—yet there is much more intimate contact (and this is really what matters) between the patients. They play together, they roll about on the floor, and as they are not at all ill, they are frequently somewhat boisterous, and the contact between one patient and another is very intimate.

The convalescent wards are wooden buildings with porous floors, which are frequently and unavoidably infected by the excreta of the smaller patients. The percentage of staff to patients is much smaller, and the responsible head of each ward is not a sister but a staff nurse, who has received a much shorter period of training. Under these circumstances it would be difficult to eradicate this extrinsic infection, even if it were on the surface and accessible. There is, moreover, reason to believe that in many cases the infection is partially inaccessible.

It will be noted from the annexed tables that in a large number of cases—73 per cent.—a patient who was supposed to have infected another was at the time suffering from a discharge from the nose or ears, though this had ceased before he was discharged from hospital. In many cases this discharge reappeared within a few days after the patient left hospital. This means in all probability that in the case of the nose, besides the organisms on the surface, which are probably kept in check by the daily douching in hospital, there are also others deeper down, or possibly in the accessory sinuses, which may come to the surface when the patient returns to his more or less uncleanly surroundings. There is a certain amount of histological evidence to support this. In the case of the ear the evidence is even stronger. In the cases where the discharge is intermittent it is probable that not only the tympanic cavity but also the mastoid antrum and surrounding cells are affected. The extent of the communication between these latter and the tympanum varies

with the condition of the mucous membrane, and it thus happens that when a discharge has ceased it really often means only that the tympanum itself is no longer secreting, while pockets of infected matter remain in the cells and the temporal bone. These pockets may empty themselves into the tympanum after the patient has been discharged from hospital, and cause infection of another case. Of this I have recently had ocular proof. In two cases where the patients had suffered from an intermittent discharge from the ears, I operated on the mastoid process after the discharge from the ear had ceased. In each case I found extensive disease of the mastoid antrum and cells, and I have little doubt that the discharge from these situations is as infectious as that in the tympanum. The great difficulty in practice lies in determining, on the cessation of a visible discharge from the ear, whether the cure is real or only apparent; in the latter case, the mastoid cells and antrum require incision and drainage.

So the difficulty of freeing a patient from superadded infection cannot, I think, be solved simply by isolating one's convalescents, though this should invariably be done.

What is also necessary is that anything like intimate contact between convalescents, either within doors or in the ward, should be prevented. This is simply a question of an increased staff—in other words, of expense. For my own part, I am inclined to lay greater stress on the supervision of convalescents than on the necessity which undoubtedly exists for the provision of impervious wards—that is to say, I do not think that alteration of the wards alone will solve the problem. It would probably be desirable to have the convalescent wards arranged in two sets, so that a process of decantation, as it were, could take place before the patient was discharged from hospital. This has been tried with success at Southampton, though the numbers are there perhaps too small to afford any statistical proof. Whatever plan be adopted, there is a certain type of case that I think will always give trouble, viz., an attack of septic scarlet fever occurring in an ill-nourished child with rickets and nasal obstruction, and it would be desirable to isolate these cases in small wards from the commencement of the illness.

To sum up, there are, in my opinion, indications that the number of return cases might be diminished by considerably increasing the nursing staff, in order to prevent anything like intimate contact between convalescent patients, and by separating patients suffering from abnormal or severe types of the disease from the remainder. This would entail considerable additional expense, and it is quite an open question whether this should be incurred in order to diminish the incidence of what after all only occasionally happens. It is necessary to remember that to the large majority of children who contract an attack of scarlet fever, and are nursed in hospital, their stay therein is productive of nothing but good.

Statistical Report for the Year 1904.

Remaining in Hospital January 1st, 1904	310
Patients admitted during 1904	2397
	2707

Discharged.

Cured and Died	2283
Remaining in Hospital December 31st, 1904	424
	2707

Total number of Deaths during 1904	158
Net Mortality	6·5°/₀

Of the deaths, 36 occurred within 48 hours of admission.

Daily Averages.

Patients	308·8
Nurses and Servants	160·1
Officers	6·8
Daily average stay, in days	49·7

Table showing Monthly Distribution of Principal Diseases throughout the Year.

1904	Scarlatina	Diphtheria	Enteric Fever	Erysipelas	Other Diseases	Total	Daily Average Number of Patients in Hospital
January	102	16	16	4	21	159	282·8
February	105	23	14	6	16	164	258·9
March	124	26	20	2	18	190	246·8
April	123	13	8	8	20	172	251·0
May	121	14	22	4	16	177	262·7
June	134	17	14	4	19	188	261·9
July	141	12	7	4	18	182	280·0
August	121	14	23	2	12	172	275·6
September	190	22	19	4	31	266	317·3
October	212	34	26	11	21	304	389·7
November	170	28	15	6	18	237	447·6
December	117	32	21	4	12	186	431·4
Total	1660	251	205	59	222	2397	308·

Case Mortality for 1893-1904.

Year 1893	9·36	Year 1899	7·11
„ 1894	7·82	„ 1900	6·22
„ 1895	9·73	„ 1901	7·15
„ 1896	10·60	„ 1902	8·80
„ 1897	8·60	„ 1903	8·50
„ 1898	10·70	„ 1904	6·05

Total Average Case Mortality for the last Twelve Years.

Year	Disease	Mortality per cent.	Year	Disease	Mortality per cent.
1890	Scarlatina	12·2	1890	Enteric fever	16·4
1891	Do.	6·9	1891	Do.	19·1
1892	Do.	9·1	1892	Do.	19·1
1893	Do.	6·9	1893	Do.	18·6
1894	Do.	4·4	1894	Do.	15·9
1895	Do.	7·1	1895	Do.	20·1
1896	Do.	8·5	1896	Do.	19·6
1897	Do.	6·1	1897	Do.	13·3
1898	Do.	6·7	1898	Do.	16·1
1899	Do.	3·6	1899	Do.	12·3
1900	Do.	4·6	1900	Do.	11·8
1901	Do.	4·7	1901	Do.	13·9
1902	Do.	6·1	1902	Do.	10·9
1903	Do.	4·7	1903	Do.	19·2
1904	Do.	3·3	1904	Do.	14·1

Table showing Numbers of Various Diseases treated.

Disease	Remaining in Hospital, Jan. 1st, 1904	Admitted during 1904	Dismissed, Cured, and Died During 1904	Remaining in Hospital, Dec. 31st, 1904
Scarlatina	219	1660	1560	319
Diphtheria	29	251	226	54
Enteric Fever	54	205	233	26
Erysipelas	7	59	59	7
Puerperal Fever	0	16	16	0
Morbilli	0	10	10	0
Other Diseases	1	196	179	18
Total...	310	2397	2283	424

Scarlatina.

Age of Patients	Male			Female			Total		
	Ad-mitted	Died	Mor-tality per cent.	Ad-mitted	Died	Mor-tality per cent	Ad-mitted	Died	Mor-tality per cent.
Under one year...	8	3	37·5	4	...	...	12	3	25·0
1 to 2 years...	17	6	35·2	22	1	4·5	39	7	1·7
2 to 3 " ...	61	3	4·9	48	6	12·5	109	9	8·2
3 to 4 " ...	68	4	5·8	62	9	14·5	130	13	10·0
4 to 5 " ...	88	3	3·4	84	3	3·5	172	6	3·4
5 to 10 " ...	374	9	2·4	413	5	1·2	787	14	1·9
10 to 15 " ...	146	2	1·3	153	1	0·6	299	3	1·0
15 to 20 " ...	26	...	...	40	...	...	66	...	...
20 to 25 " ...	9	...	...	14	...	...	23	...	...
25 to 30 " ...	3	...	...	13	...	...	16	...	...
Over 30 " ...	4	...	...	3	...	...	7	...	...
Total	804	30	3·7	856	25	2·9	1660	55	3·3

Seven deaths occurred within 48 hours of admission.

Average stay in Hospital ....year 1901...55·8 days.
Do. do. ....year 1902...57·3 days.
Do. do. ....year 1903...53·8 days.
Do. do. ....year 1904...55·4 days.

Average stay in Convalescent Ward...year 1902...22·8 days.
Do. do. ....year 1903...23·0 days.
Do. do. ....year 1904...24·6 days.
Do. Acute Ward......... ..year 1902...34·5 days.
Do. do. ....year 1903...30·8 days.
Do. do. ....year 1904...30·8 days.

Year	No. of Scarlatinal Fever Discharges	No. of Cases of Post Scarlatinal Diphtheria	Percentage	Died
1901	2669	104	3·8	3
1902	2018	29	1·4	1
1903	1877	8	0·4	2
1904	1560	7	0·4	0

Percentage Complications in Scarlet Fever, 1904.

Complication	No.	Percentage
Otorrhœa	445	28·5
Rhinorrhœa	384	24·6
Nephritis	42	2·6
Albuminuria	30	1·9
Endocarditis	26	1·6
Adenitis	30	1·9
Synovitis	2	0·1

All patients with diphtheria, and all those suffering from scarlet fever who had at any time a discharge from the nose or ears, were examined for diphtheria bacilli before being discharged from the hospital.

Table 1.—Diphtheria.

Age of Patients	Male			Female			Total		
	Admitted	Died	Mortality percent.	Admitted	Died	Mortality per cent.	Admitted	Died	Mortality per cent.
Under 1 year ...	4	1	25·0	5	...	...	9	1	11·1
1 to 2 years ...	11	4	36·3	4	3	75·0	15	7	46·6
2 ,, 3 ,, ...	10	6	60·0	7	1	14·2	17	7	41·1
3 ,, 4 ,, ...	18	3	16·6	13	2	15·3	31	5	16·1
4 ,, 5 ,, ...	9	...	...	11	3	27·2	20	3	15·0
5 ,, 10 ,, ...	41	8	19·5	51	7	13·7	92	15	16·3
10 ,, 15 ,, ...	18	1	5·5	18	2	11·1	36	3	8·3
15 ,, 20 ,, ...	2	...	...	7	...	...	9	...	...
20 ,, 25 ,, ...	3	...	...	5	...	...	8	...	...
25 ,, 30 ,, ...	3	...	...	4	...	...	7	...	...
Over 30 ,, ...	2	...	...	5	...	...	7	...	...
Total	121	23	19·0	130	18	13·8	251	41	16·3

Fourteen deaths occurred within 48 hours of admission.

Table 2.—Tracheotomy Cases.

Age of Patients	No. of Patients	Died	Mortality per cent.
Under 1 year	2	...	...
1 to 2 years	2	1	50·0
2 „ 3 „	6	4	66·6
3 „ 4 „	8	2	25·0
4 „ 5 „	2	...	...
5 „ 10 „	5	1	20·0
10 „ 15 „	...	...	...
15 „ 20 „	...	...	...
Total	25	8	32·0

Of these, 5 died within 48 hours of admission.

DIPHTHERIA.

Average stay in Hospital, in days, year 1901, 31·8
Do. do. „ 1902, 50·7
Do. do. „ 1903, 34·1
Do. do. „ 1904, 37·3

Table 3.—Complications of Diphtheria.

Complication	Number of Cases	Percentage
Otorrhœa	7	3·1
Rhinorrhœa	5	2·2
All forms of Paralysis	36	15·9
Cardiac Paralysis..................	10	4·4
Ocular Muscles alone	5	2·2
Pharynx alone	...	...
Palate alone........................	19	8·4
Diaphragm alone..................	2	0·8
Laryngeal alone	...	...
Hæmorrhage	5	2·2
Adenitis of Convalescence	5	2·2

Diphtheria Bacilli.*

Age of Patients	Male Admitted	Male Died	Male Mortality per cent.	Female Admitted	Female Died	Female Mortality per cent.	Total Admitted	Total Died	Total Mortality per cent.
Under 1 year......	...	...	...	...	...	...	...	...	...
1 to 2 years ...	...	...	...	...	...	...	...	...	...
2 to 3 ,, ...	...	...	...	...	...	...	...	...	...
3 to 4 ,, ...	...	...	...	...	...	...	...	...	...
4 to 5 ,, ...	...	...	...	...	...	...	...	...	...
5 to 10 ,, ...	2	...	...	...	...	...	2	...	...
10 to 15 ,, ...	4	...	...	3	...	...	7	...	...
15 to 20 ,, ...	...	...	...	...	...	...	...	...	...
20 to 25 ,, ...	...	...	...	...	...	...	...	...	...
25 to 30 ,, ...	...	...	...	...	...	...	...	...	...
Over 30 years......	...	...	...	...	...	...	...	...	...
Total......	6	...	...	3	...	...	9	...	...

* This table shows cases that were suffering from a nasal discharge containing diphtheria bacilli, but which had no signs of diphtheria clinically.

Table showing day of Disease on Admission (all Cases).

Day of Disease on Admission	No.
1st Day	3
2nd ,, ...	31
3rd ,, ...	30
4th ,, ...	42
5th ,, ...	31
6th ,, ...	33
7th ,, ...	16
8th ,, ...	15
9th ,, ...	7
10th ,, ...	5
Over 10 Days	13
Total	226

Table showing day of Disease on Admission (Deaths only).

Day of Disease on Admission	No.
1st Day	1
2nd "	6
3rd "	10
4th "	5
5th "	3
6th "	7
7th "	3
8th "	3
9th "	1
10th "	...
Over 10 Days	2
Total	41

Table showing interval elapsing between Date when Patient was first seen by a Medical Man and the Date of Admission to Hospital.

	All Cases	Deaths
Sent in on same day	122	23
2nd day	41	3
3rd "	25	8
4th "	18	6
5th "	7	...
6th "	5	...
7th "	2	1
8th "	1	...
9th "	...	...
10th "	1	...
Over 10 days	4	...
	226	41

Enteric Fever.

Age of Patients	Male			Female			Total		
	Ad-mitted	Died	Mor-tality percent.	Ad-mitted	Died	Mor-tality percent.	Ad-mitted	Died	Mor-tality per cent
Under one year...	...	...	...	...	...	...	...	...	...
1 to 2 years...	1	...	...	1	...	...	2	...	...
2 to 3 ,, ...	...	...	...	...	...	...	...	...	...
3 to 4 ,, ...	3	...	...	...	...	...	3	...	...
4 to 5 ,, ...	2	...	...	...	...	...	2	...	...
5 to 10 ,, ...	12	2	16·6	12	...	...	24	2	8·3
10 to 15 ,, ..	18	1	5·5	13	1	7·6	31	2	6·4
15 to 20 ,, ...	15	2	13·3	14	2	14·2	29	4	13·7
20 to 25 ,, ...	23	2	8·5	13	2	15·3	36	4	11·1
25 to 30 ,, ...	18	4	22·2	12	1	8·3	30	5	16·6
30 to 35 ,, ...	13	3	23·0	11	3	27·2	24	6	25·0
35 to 40 ,, ...	8	2	25·0	3	2	66·6	11	4	36·3
40 to 45 ,, ...	3	...	...	2	1	50·0	5	1	20·0
45 to 50 ,, ...	5	1	20·0	2	...	...	7	1	14·2
Over 50 ,, ...	1	...	...	...	...	...	1	...	...
Total...	122	17	13·9	83	12	14·4	205	29	14·1

Six deaths occurred within 48 hours of admission.

Average stay, in days, in Hospital ....year 1901...40·8 days

Do. do. ....year 1902...47·8 days

Do. do. ....year 1903...40·5 days

Do. do. ....year 1904...41·1 days

Percentage Complications in Enteric Fever.

Complication	No.	Percentage	Complication	No.	Percentage
Bronchitis	...	...	Intestinal Hæmorrhage	14	6·0
Pneumonia ...	1	0·4	Perforation ...	7	3·0
Relapse	11	4·7	Neuritis	...	...

Erysipelas.

Age of Patients	Male			Female			Total		
	Admitted	Died	Mortality per cent.	Admitted	Died	Mortality per cent.	Admitted	Died	Mortality per cent.
Under 5 years ...	1	...	...	4	1	25·0	5	1	20·0
5 to 10 " ...	1	...	...	1	...	...	2	...	...
10 to 15 " ...	...	...	...	...	...	...	...	...	...
15 to 20 " ...	1	...	...	5	...	...	6	...	...
20 to 25 " ...	4	...	...	2	...	...	6	...	...
25 to 30 " ...	2	...	...	3	...	...	5	...	...
30 to 35 " ...	2	...	...	...	...	...	2	...	...
35 to 40 " ...	3	...	...	2	...	...	5	...	...
40 to 45 " ...	2	1	50·0	3	...	...	5	...	...
45 to 50 " ...	6	...	...	2	1	50·0	8	1	12.5
Over 50 " ...	12	2	16·6	3	...	...	15	2	13.3
Total...	34	3	8·8	25	2	4·0	59	4	6·7

Other Diseases.

Certified as	Actual Disease	No.	Certified as	Actual Disease	No.
Scarlatina......	Tonsillitis	28	Diphtheria ...	Pneumonia Septic Tonsillitis.........	1
"	Erythema	6	" ...	Morbilli.........	3
"	No obvious disease	35	" ...	Secondary Syphilis	2
"	Rötheln.........	12	" ...	Laryngitis	1
"	Dermatitis	1	" ...	Post Pharyngeal Abscess	1
"	Morbilli.........	3	" ...	Enteric Fever...	1
"	Cellulitis	1	" ...	Erythema	2
"	Otorrhœa	1	" ...	Coryza	1
"	Enteric Fever...	1	" ...	No obvious Disease	2
"	Tubercular Meningitis .	2	Erysipelas ...	Morbus Cordis	1
"	Quinsy	1	" ...	Boil on Face ...	1
"	Diphtheria......	1	" ...	Osteomyelitis...	1
Enteric Fever..	Pneumonia ...	9	" ...	Abscess of Thigh.........	1
"	Phthisis	3	" ...	Granular Kidney Urœmia.	1
"	Enteritis	5	Morbilli	....	10
"	Influenza	2	" ...	Coryza	1
"	Meningitis	1	Puerperal Fever ...	....	16
"	Pleurisy and Effusion......	1	Phthisis ...	....	24
"	Acute Melancholia.........	1	Anthrax ...	....	1
"	Bronchitis	2	Sent in with Mother ...	....	2
"	Appendicitis ...	2			
Diphtheria ...	Tonsillitis	19			
" ...	Laryngismus Stridulus ...	1			
" ...	Scarlatina	2			

29 deaths, 7 occurred within 48 hours of admission. Total mortality of other diseases 13·06 per cent.

ENTERIC FEVER.

TABLE SHOWING DAY OF DISEASE ON ADMISSION (DEATHS ONLY).

Day of Disease on Admission	No.
1st Day	...
2nd „	...
3rd „	...
4th „	...
5th „	...
6th „	1
7th „	3
8th „	1
9th „	1
10th „	3
Over 10 days	20
Total	29

TABLE SHOWING INTERVAL ELAPSING BETWEEN DATE WHEN PATIENT WAS FIRST SEEN BY A MEDICAL MAN AND THE DATE OF ADMISSION TO HOSPITAL.

	All Cases.	Deaths.
Sent in on same day	2	1
2nd Day	6	...
3rd „	9	2
4th „	18	1
5th „	17	2
6th „	27	...
7th „	17	5
8th „	22	4
9th „	16	1
10th „	24	1
Over 10 days	75	12
Total	233	29

ENTERIC FEVER.

Taable showing Day of Disease on Admission (all Cases).

Day of Disease on Admission	No.
1st Day	...
2nd "	...
3rd "	...
4th "	2
5th "	4
6th "	10
7th "	17
8th "	10
9th "	6
10th "	21
Over 10 Days	163
Total	233

PARTICULARS OF RETURN CASES OF SCARLET FEVER.

No. of alleged originating Cases 128

Do. return Cases 131

Table I.

Showing duration of stay in Hospital in Convalescent Ward.

	Convalescent Ward
Under 14 days	7
14 to 21 "	52
21 to 28 "	28
28 to 35 "	7
Over 35 "	16
Not in Convalescent Ward at all	18
Total	128

Total stay in Hospital.

	Total Residence
4 to 5 weeks	—
5 to 6 "	12
6 to 7 "	31
7 to 8 "	23
8 to 12 "	53
Over 12 "	9
Total...........	128

Table 2.

Showing Condition of Discharge of Originating Case.

Nothing abnormal on discharge....................	120
Of these, nothing abnormal after discharge... ...	72
Otorrhœa subsequently	9
Peeling do.	6
Rhinorrhœa do.	32
Sores on nose or lips subsequently...........	9
	56
Abnormality on discharge—	
Otorrhœa on discharge	1
Peeling do.	4
Rhinorrhœa do.	2
Sores on nose or lips on discharge...........	1
	8

Table showing interval between the Discharge on the alleged Originating Case and the Infection of the second.

Time	No. of Cases
24 hours	1
48 ,, ...	2
72 ,, ...	5
4 days	9
5 ,, ...	9
6 ,, ...	15
7 ,, ...	7
7 to 14 days.....................	30
2 to 3 weeks.....................	18
3 to 4 ,, ...	9
Over 4 ,, ...	23
Total	128

In addition to these, 6 cases occurred which were described by the Medical Officer of Health as subsequent but not as return cases.

A. K. Gordon.

BAGULEY SANATORIUM FOR INFECTIOUS DISEASES.

Medical Superintendent's Report.

The Baguley Sanatorium, erected by the Urban District Council of Withington for the treatment of Infectious Diseases, was formally opened by the Earl of Derby on October the 4th, 1902, and was thrown open for the reception of patients at the beginning of December in the same year. On the amalgamation of the Withington Urban District with the City of Manchester, which took place on November the 9th, 1904, this hospital passed into the hands of the Corporation of Manchester. During the 13 months ending December 31st, 1903, 307 patients were admitted to the hospital. Of these, 226 were sent in as *Scarlet Fever*, 58 as *Diphtheria*, and 23 as *Enteric Fever*. Patients discharged previous to January 1st, 1904, numbered 255. Patients remaining on that date 35. 17 deaths occurred during 1904—8 from *Scarlet Fever*, 7 from *Diphtheria*, and 2 from *Enteric Fever*. During the year ending December 31st, 1904, 289 patients have been under treatment in this hospital. These were divided amongst the various districts entitled to send cases to the hospital as follows:—

List A.—*All cases—Present in Hospital on January 1st, 1904, and admitted during 1904, according to the district from which they came.*

District	Cases in Hospital on Jan. 1st, 1904	Cases admitted during 1904	Dis-charged 1904	Cases in Hospital on Jan. 1st, 1905	Died 1904	Total Cases treated 1904
Withington	13	41	39	12	3	54
Moss Side.........	5	59	55	8	1	64
Levenshulme ...	4	28	23	7	2	32
Bucklow	13	114	105	17	5	127
Other Districts...	0	10	10	0	0	10
Private Cases ...	0	2	2	0	0	2
Totals	35	254	234	44	11	289

LIST B.—*All cases admitted during 1904—Divided according to their diagnosis, and the district from which they came.*

DISTRICT	Scarlet Fever	Diphtheria	Enteric Fever	Cases sent in as one disease found on admission to be suffering from another disease	Cases found on admission to be suffering from two or more diseases—Mixed infection	TOTAL
Withington	32	6	1	0	2	41
Moss Side.........	50	7	2	0	0	59
Levenshulme ...	19	5	2	0	2	28
Bucklow	91	13	4	1	5	114
Other Districts...	8	0	0	1	1	10
Private Cases ...	2	0	0	0	0	2
Totals	202	31	9	2	10	254

In addition to the above, the following cases occurred amongst the staff:—

One female—Septic Endocarditis. Discharged in fair health.

One female—Diphtheria and Scarlet Fever together. Discharged well.

One female—Diphtheria. Discharged well.

One male—Scarlet Fever. Discharged well.

SCARLET FEVER.

With regard to cases of Scarlet Fever, the total number under treatment was 228, divided as follows:—

LIST C.—*Cases of Scarlet Fever only.*

District	Cases in Hospital on Jan. 1st, 1904	Admitted	Discharged	Died	Cases in Hospital on Jan. 1st, 1905	Total cases treated	Percentage Death-rate on all cases discharged
							per cent
Withington ...	9	32	28	2	11	41	6·66
Moss Side	3	50	44	1	8	53	2·22
Levenshulme...	4	19	16	1	6	23	5·88
Bucklow	10	91	83	2	16	101	2·35
Other Districts.	0	8	8	0	0	8	—
Private Cases...	0	2	2	0	0	2	—
Totals	26	202	181	6	41	228	3·19

The incidence of Scarlet Fever according to age and sex was as follows for each district :—

List D.—*Incidence of Scarlet Fever according to age and sex.*

District	Age 1 to 5		Age 5 to 10		Age 10 to 20		Age over 20		Totals		
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total
Withington ...	7	1	5	12	4	1	0	2	16	16	32
Moss Side ...	6	1	16	9	7	6	4	1	33	17	50
Levenshulme..	5	0	4	3	1	2	2	2	12	7	19
Bucklow	9	10	14	24	12	13	2	7	37	54	91
Other Districts	0	0	1	3	0	2	2	0	3	5	8
Private Cases..	—	—	—	—	—	—	1	1	1	1	2
Totals	27	12	40	51	24	24	11	13	102	100	202
Totals	39		91		48		24				

List E.—*The following complications occurred :—*

No. of times occurring		Percentage of cases discharged
Single Otorrhœa	11	6·07
Double Otorrhœa	10	5·52
Nasal Discharge	36	19·88
Simple Adenitis	23	12·70
Suppurative Adenitis	1	0·55
Nephritis (with Hæmaturia) ...	4	2·21
Rheumatism :—		
Before admission ....3 } After admission ....3 }	6	3·31
Endocarditis	2	1·10

I find, from notes made at the time of admission of each case, that 13 are stated to be bad anginose, three to be anginose, and two to be toxæmic—18 very bad cases out of 202—a percentage of 8·9, which seems rather high. One case of Scarlet Fever was admitted, suffering in addition from Tubercular Enteritis. According to the history given this was a second attack of the latter disease, the child having had an extremely severe attack about six months before. The child recovered, sufficiently to be sent home, after 63 days. One case of Scarlet Fever (very severe anginose) with enormous swelling of the neck, required sudden and immediate tracheotomy. The child lived for 12 hours after the operation, but succumbed to the effects of the Scarlet fever.

One case of *Chorea* following Scarlet Fever occurred—a girl, aged four years. This child had also double Otorrhœa, and developed Pertussis. Complete recovery from all these occurred before the child left hospital. Cases of Otorrhœa are very numerous, and I am at a loss to account for this. It must be remembered, however, that a great number of these cases had Otorrhœa before admission. Many others also had Nasal Discharge on admission.

It will be seen that one case of *Suppurative Adenitis* is included in the list of complications. This was actually in hospital before I came here, and the suppuration had taken place. I claim to have had no case of Suppurative Adenitis, although many cases of simple Adenitis have occurred, and I feel that this is in some measure due to the energetic treatment used in the early stages in all cases, whether mild or severe.

Most of the cases of simple Adenitis were suffering from enlarged and painful glands in the neck when admitted to hospital. We do not get our cases here, as a rule, very early in the disease, and I think that in many of these cases having glands enlarged when admitted, unless the source of further infection had been rendered more or less harmless by repeated douching and swabbing, the continuous accumulation of more and more infective matter in the glands, already slightly infected, would have brought about suppuration. In the treatment of Scarlet Fever I have for the past two years followed a very definite line, basing my action on the belief that the result of the case for good or ill, for recovery or the reverse, and for the occurrence or prevention of complications, is, more or less definitely determined during the first few days of the disease.

I am inclined to lay great stress upon the necessity of

(*a*) Treating the throat of a Scarlet Fever patient just as assiduously if it appears to be only *slightly congested* as if it was obviously very septic.

(*b*) Making the skin act freely *from the first*, and so by reducing the amount of toxine in the system without calling upon the kidneys for extra work, reducing the chances of complications occurring.

(*c*) Watching all cases carefully with a view to observing such symptoms or groups of symptons as will give *warning* of the onset of complications, so that one may gain a start upon such complications.

It has seemed to me that the greatest factor in the causation of Nephritis in Scarlet Fever is the absorption from the throat of *toxines*, and the failure of that poison to become eliminated by the skin or by means of discharges ; and that the amount of toxine absorbed is often greatest in *mild* and even very mild cases - the throat in such cases being often regarded as not needing any treatment.

The fact that, in my experience, Endocarditis and Nephritis seem to occur, as it were, in waves, being common complications in certain batches of cases, and very rare in other batches, suggests, to my mind at any rate, that possibly the type of Scarlet Fever varies somewhat either according to districts or to states of the weather, and the fact that certain families are found to be more liable to complications after Scarlet Fever than others would imply that the personal equation is not inconsiderable in the causation or prevention of such complications.

In pursuance of the idea that the mild cases, if untreated, are as dangerous as the cases with obviously dirty throats, the throats of *all* cases, however mild they may seem, are douched with a weak antiseptic solution at least as often as *every four hours for the first ten days.*

In addition to the repeated douching of all cases, the swabbing of the fauces of septic and anginose cases, and the attempts to make the skin act freely from the earliest days of the disease, I have for some considerable time been following out an idea that occurred to me about two years ago, when, as Assistant Medical Officer at Monsall Hospital, I had charge of many more patients than are available here. It first of all occurred to me that in all probability many of the severe cases of Scarlet Fever, whether anginose or toxæmic, were possibly suffering at the same time from Diphtheria. With this idea in my mind, I gave *Diphtheria-antitoxin* to such cases, with markedly good results. I do not propose to enlarge upon this subject at present, as I am engaged upon a paper dealing with the matter which will shortly be published; but I will add that, after taking repeated swabs from the throats and noses of these cases, and failing to find any trace of Diphtheria bacilli, I was forced to the conclusion that Diphtheria did not, after all, co-exist in these cases. I need hardly say that no membrane was actually visible in such cases as I refer to, and that such symptoms as existed would be as likely to arise from Scarlet Fever as from Diphtheria.

In view, then, of the very marked improvement shown by those cases of *Scarlet Fever* that received *Diphtheria-antitoxin*, I could not but conclude that possibly the Diphtheria-antitoxin acted in some manner inimical to the germ or germs causing the Scarlet Fever ; but I do *not* believe, judging only from clinical observation, that the Diphtheria antitoxin acts against Scarlet Fever by neutralising *toxines* already absorbed into the system, but merely *prevents the formation of further toxines*, or, at any rate, *renders such toxines innocuous before they can be absorbed.*

I propose to enter into this at a later date. In the meantime, I rely upon the Diphtheria-antitoxin to prevent the absorption or formation of further poison (using it only in very bad cases); and upon hot baths, hot packs, etc., to make the skin act freely, and eliminate such poison as has been already absorbed into the system.

During the year, 178 cases of Scarlet Fever were under treatment while I was actually in charge of the hospital—50 others while I was absent or prevented from doing my work. Of these 178, only *three* ended fatally—a percentage of 1·68; and although the total number treated is very small for basing any argument upon, yet I am firmly convinced that not a few others of those 178 cases would have ended fatally if they had not received the treatment indicated above. I mention the matter, however, solely in the hope that someone with a greater number of patients under his care, available for treatment, may think it worth while to take up the suggestions which I have made. I can bring no other testimony forward as to the marked improvement in the cases except my own; but I may say that some of the results were very striking, and in one case it seemed as if a moribund patient recovered entirely as the result of the above-mentioned treatment.

As a matter of fact, in the three cases that ended fatally out of the 178 under treatment by myself, antitoxin was not used, for reasons which it would take too long to explain (one case, for example, died within a few hours of admission, after requiring tracheotomy on admission), so that during 1904 no case of Scarlet Fever ended fatally that had received Diphtheria-antitoxin, and yet there were some very bad cases that were treated in that manner.

Since writing the above, I have read in the "Practitioner" for April, 1905, an article: "Prize Essay. The Treatment of Diphtheria"—by J. T. C. Nash, M.D. (Edin.), D.P.H. (Camb.), Medical Officer of Health for Southend-on-Sea, and Medical Superintendent of the Infectious Diseases Hospital, and in it I find the following sentence:—"Further, antidiphtheria serum not only has a specific effect on specific diphtheria but has also been found to be of benefit in some forms of sore throat (particularly Scarlatinal), in which repeated examination has failed to detect Klebs-Lœffler bacilli."

It is evident therefore that I have arrived independently at a similar conclusion to that reached by Dr. Nash.

RETURN CASES.

During the year, four possible "return cases" occurred: two during the first six months, two during the latter half of the year. Both the two that occurred during the first six months resulted from the same originating case.

The originating case for these two (M. M., female, aged four years) was admitted with Scarlet Fever in December, 1903; was found to be suffering also from Pertussis, and was isolated; was, in my opinion, free from Scarlet

Fever infection, and ready for discharge at the end of February, 1904—75 days from admission—but was kept in until March 22nd (97 days) at the request of the parents, in order that a chance might be given for her to get free from the infection of Whooping Cough. She last "whooped" on March 1st, and went home on March 22nd.

On March, 29th L. M. (sister of the above), aged eight years, and E. A. (playmate), female, aged four, were admitted to the hospital suffering from Scarlet Fever. It was found, on enquiry, that the sister (L. M.) had slept with M. M. ever since the latter's return home from hospital (in disregard, incidentally, of a printed notice warning the parents of the danger of this), but it was E. A., the playmate, who first of the two (by a period of 24 hours only) showed signs of Scarlet Fever. E. A. resided in the same street a few doors away. On enquiry by the Medical Officer of Health of that district, it was discovered that the clothes worn by M. M. before her removal to hospital—(one has to presume that all such clothes were handed over for this purpose)—were fumigated at the same time as the room, by means, I believe, of Formaldehyde. There is a possibility that this method of disinfection, as far as the clothes were concerned, was not efficacious. I may add that the doctor who enquired into the matter found nothing whatever in the condition of M. M. after her return home from hospital to account for her conveying infection.

The fact that these two cases began within 24 hours of each other, and that the playmate, who had not been in very intimate contact with M. M., developed the attack first, suggests the possibility that the originating case may have been due to some intermediate overlooked case.

The second originating case (W. H. W., male, aged 10) was discharged and went home on July 2nd. On July 7th a little boy (F. M., aged 2 years) living in the house adjoining began to be ill, had the rash of Scarlet Fever on July 8th, and was removed to hospital on July 11th. The Medical Officer of Health for the district informed me that on examining W. H. W. after the case of Scarlet Fever arose next door he could find no evidence of disease of a kind capable of infecting others. It is noticeable that the case arose next door, *not in the same house*; and that a *sister*, aged 9, and a brother, aged 6, who were at home when W. H. W. returned there, *developed no signs of Scarlet Fever.* The Medical Officer of Health for the district, however, regarded this as a genuine "Return Case," and he would have greater facilities than I for coming to an opinion on the matter.

The third originating case (H. C., aged 8) left hospital and went home on December 10th, after a stay of 69 days. His brother (A. C., aged 5) came in with Scarlet Fever on December 24th. There was nothing apparently wrong with H. C. when he left hospital, and the Medical Officer, who made enquiries

into the "Return Case," found no sign of ear or nasal discharge, nor any other obvious cause of infection in the boy after he had gone home. A. C. had been attending school during the fortnight before he caught Scarlet Fever, and on January 11th, 18 days later, another boy came into hospital with Scarlet Fever from the same school. Whether or not both these cases were infected from some overlooked case at the school it is impossible to say, but on enquiry it turns out that the two boys were not at any rate in the same class.

In the hope of reducing to some extent the number of "return cases," the following lines are followed by me here :—

1. Careful and systematic treatment of the throat and nose at first. In the case of the throat this is continued *for at least ten days.*

2. Douching of the throat thereafter *every day*, until

3. Transference to the convalescent ward. This takes place, as a rule, at about the end of the fourth week ; but I do not allow any very congested throat to go into the convalescent wards if I can avoid it. These wards are kept as thoroughly clean as possible, and are disinfected—washed down with freshly-made chlorinated lime solution, and all cracks and crevices sprayed with formalin solution—every two or three months. By observing the above precautions as to transference of cases, one hopes to avoid, in some measure, the danger arising from the aggregation of acute cases.

4. More frequent treatment of the throat recommences when the patient reaches the convalescent ward, and if there is any nasal or ear discharge, attention is, of course, given to it. At intervals of two or three days I examine each throat and nose, and order more or less treatment, as seems necessary in each case, ringing the changes chiefly upon douching with boracic lotion, painting the fauces with glycerine and iron, and spraying the fauces and tonsils with a solution of formalin. In the case of most of the patients *all* these three methods of treatment are used three times a day for the three or four days previous to their "showing up for discharge," and again, as an extra precaution, until the day they leave hospital. The ears and nose are carefully douched or syringed out before the patient is shown up for discharge, and again on the morning of his leaving hospital.

5. *No bath* is given *upon the day of discharge*—the idea being that a cold drive, often in the open, after a hot bath might bring on a nasal discharge which might be infectious. On the *evening before* going home the patient has an Izal bath, and is then put into clean night-clothes and a clean bed, in a ward used only for this purpose, which is often cleaned, and is thoroughly disinfected every two or three months.

6. On the following morning the patient, if a child, is washed by the nurse. The hair is carefully attended to, the ears are *syringed* out, the nose is douched, the throat is douched and painted and sprayed, and the patient is ready to be examined by me. If I notice any suspicion of anything likely to cause infection outside, I keep back the patient even at the eleventh hour; but if not, the child is taken to the lodge and handed over to its parents, or is sent out to its home in a closed but well-ventilated brougham. I may add that the nurse who prepares the patients, and eventually hands them over to the parents, *puts on a clean uniform* first thing in the morning, and *does not go into the main ward at all*—not even the convalescent ward—until such patients as are to be discharged on that day have left the hospital.

RELAPSES.

Some cases of relapse occurred. Three had a definite recurrence of all symptoms of Scarlet Fever—all had been signed up as having desquamated in typical fashion as the result of the first attack, and all were watched by myself through *both* attacks. Other cases had simply mild recurrences of the throat symptoms.

It has been, and is, held that these relapses are due to the reinfection of one patient with infectious matter (possibly the result of a different micro-organism) carried from one Scarlet Fever patient to another. Possibly this is so, but I think that there is something to be said in favour of another theory, namely, that of the reinfection of the patient by infectious matter retained in his or her own throat, nostrils, naso-pharynx, or Eustachian tubes.

Most of the cases (all except one) that have occurred here have arisen in the *convalescent* wards, where the throats are not so acutely infectious as in the acute wards. The amount of actual douching done is about the same in the acute as in the convalescent wards.

Again, by the courtesy of two medical men, I have received notes of three cases of undoubted Scarlet Fever, in whom definite relapses occurred; there being in these instances no possibility of the reinfection coming from association with another case of Scarlet Fever.

If one might be allowed to theorise on the subject, one might suggest that, possibly, the germs of Scarlet Fever might lie dormant in the mucous membrane of the nose, throat, etc., until disturbed by some means, as, for example, a renewal of the douching of the nose after an interval. But the question as to whether the germs that cause Scarlet Fever penetrate into the lower layers of the mucous membrane of throat, naso-pharynx, nostrils, etc., and are removed as successive layers of the mucous membrane are rubbed off or washed away, as I personally believe, can only be settled by pathological evidence.

DIPHTHERIA.

During the year 35 cases have been under treatment :—

List F.

	In Hospital, January 1st, 1904		Admitted, 1904		Total	Discharged, 1904	Died, 1904	Remaining on January 1st, 1905	Total
	M.	F.	M.	F.					
Withimgton ...	0	3	2	4	9	8	0	1	9
Moss Side	0	1	5	2	8	8	0	0	8
Levenshulme ...	0	0	1	4	5	4	1	0	5
Bucklow	0	0	3	10	13	11	1	1	13
Other Districts	0	0	0	0	0	0	0	0	0
Totals	0	4	11	20	35	31	2	2	35
Totals	4		31						

Of the deaths that occurred, both were females below the age of five.

The percentage of deaths to cases treated is 5·71.

The incidence according to age of all cases admitted during the year was as follows :—

List G.

	Diphtheria Admission, 1904 — Age Incidence, compiled according to Districts										
	Age 1 to 5		Age 5 to 10		Age 10 to 20		Age over 20		Totals		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total
Withington	0	0	2	2	0	0	0	2	2	4	6
Moss Side..................	1	0	0	1	2	0	2	1	5	2	7
Levenshulme	0	1	1	2	0	1	0	0	1	4	5
Bucklow	2	2	0	2	1	2	0	4	3	10	13
Totals	3	3	3	7	3	3	2	7	11	20	31
Totals	6		10		6		9		31		..

An interesting thing to note is that 9 of the 35 cases admitted were over the age of 20, a percentage of 26.

Of these :—25 cases were faucial

One case—Faucial-hæmorrhagic

Two cases—Faucial and secondary laryngeal

One case—Faucial, nasal, and laryngeal

Two cases—Primary laryngeal.

Two deaths occurred—one of them in a hæmorrhagic case, the other in a bad laryngeal case; both were under 5 years of age.

(*a*) The first, a female, aged 2 years, had had no antitoxin, and was exceedingly ill with toxæmia on admission, and only lived for two more days. In this case, in addition to the Diphtheria, I suspected also Scarlet Fever, but could not be sure of it. A sister of this child had been in hospital two days when the latter was admitted, and was definitely suffering from Scarlet Fever and Diphtheria.

(*b*) The second case, female (aged 4 years) was admitted on the sixth day of disease, and had had antitoxin just before admission. Thanks to a warning I received by telephone, I was waiting in the ward for this patient when she was brought in, and tracheotomy was performed within a minute of admission, and only just in time. The child, however, never recovered its colour, being completely poisoned by the dose of Diphtheria it had absorbed, and the case was hopeless from the first. More antitoxin was given, but death occurred about 40 hours later.

May I take this opportunity of urging the necessity for the early administration of antitoxin, in a *sufficiently large* dose, to any case *suspected* of being Diphtheria without waiting for the result of a bacteriological examination. My own view is, and I believe it to be the practice in many fever hospitals, that in any *ordinary* case of faucial Diphtheria if antitoxin (2,000 units) be administered on the *first* day of disease, or 4,000 units on the *second* day, there is little or no danger for the child, provided always that care is taken subsequently in the matter of rest and other general treatment. In this latter connection I may say that I recently had a case brought in that had been ill with suspected Diphtheria for five days, croupy cough began on the fourth day, antitoxin 2,000 units were given, and when the ambulance arrived next day to fetch away the child she was found *fully dressed*, *playing about* in her bedroom. When she reached hospital she was very collapsed, and the croupy cough was very distressing.

If antitoxin (4,000 or 6,000 units) is administered on the *third* day, the case will *probably* proceed to a favourable recovery, though a second dose of antitoxin may be found necessary. On the *fourth* day, as a rule, 8,000 units may be necessary. On the *fifth* day it is, in my opinion, well to give a moderate dose, such as 6,000 or 8,000 units first, and repeat the same six or

eight hours later. On the sixth day the child is usually so toxæmic that antitoxin will hardly overtake the disease (I consider that the advisability or not of intravenous injection of antitoxin is still *sub judice*; there is little doubt, however, that antitoxin given in this way acts more rapidly than it would do if injected subcutaneously), but small doses, say 4,000 units, given repeatedly, are, I think, best in these cases. The medical man who gives antitoxin, even if only 2,000 units, to a case suspected of being Diphtheria, before sending the same to hospital or sending a swab for examination, very often saves the life of a child by avoiding delay. In the case of *laryngeal* Diphtheria, especially if the infection has spread from the nostrils or naso-pharynx, even greater haste in administering antitoxin is needed, *two days* often sufficing to render the case practically hopeless. I should like to add that I do not think that Diphtheria antitoxin ever does any harm. The only patients who seem to suffer much inconvenience from it are adults, who occasionally have rather severe urticarial and joint pains, and sometimes even a definite and multiple arthritis. Fortunately, however, most adults, unless the attack is a severe one, get over it without the necessity for antitoxin arising.

Five cases of Diphtheria developed paralysis of some degree :—

(*a*) Male—aged 11 years—had been ill for 5 days before admission, antitoxin given before admission; developed slight double ptosis, and cardiac weakness, in *fourth* week.

(*b*) Female—aged 9 years—had been ill for 8 days before admission, no antitoxin before admission, developed slight cardiac weakness, nervous cough, paralysis of soft palate, in *fourth* week.

(*c*) Male—aged 7 years—had been ill for 4 days before admission, antitoxin given before admission on third day of disease, developed paralysis of soft palate, some cardiac weakness, some paresis of lower limbs, about *fifth* week.

(*d*) Male—aged 2½ years—had been ill for 4 or 5 days before admission, no antitoxin before admission, developed paralysis of soft palate, and considerable paralysis of legs.

(*e*) Male—aged 5 years—had been ill for 5 days before admission. antitoxin (2,000 units) given 2 hours before admission. Child very ill indeed, more antitoxin given at once. Developed *complete paralysis* in *eighth* week, strabismus, nasal voice, regurgitation of fluids, inability to swallow anything (paralysis of pharyngeal muscles), aphonia, ineffectual cough, continuous cardiac vomiting for 48 hours, inability to move arms or legs. Rectal feeding was tried, but nothing was retained; the child was kept alive for 60 hours by hypodermic injections of brandy and strychnine alternately (incidentally I would like to add that I consider strychnine invaluable in such cases as these). Result, complete recovery and discharge from hospital after 110 days.

The following are the facts relating to Enteric Fever :—

ENTERIC FEVER.

ONLY NINE CASES OF ENTERIC FEVER WERE ADMITTED DURING 1904.

District	Remaining in Hospital, January 1st, 1904	Admitted during 1904	Discharged during 1904	Average Stay in Hospital in days	Died during 1904	Average Life in Hospital in days	Remaining in Hospital on January 1st, 1905	Total Cases treated during 1904
Withington	*One*—Female, age 13	*One*—Male, age 25	*Both* discharged, well	68	None	...	None	2
Moss Side...........	*One*—Female, age 45	Two *One*—Male, age 30 ,, ,, age 14	All *three* discharged, well	55	None	...	None	3
Levenshulme	None	Two *One*—Male, age 24 ,, ,, age 32	*One* discharged, well	36	None	...	*One* remaining on January 1st, 1905	2
Bucklow, J.H.B...	*One*—Female, age 35	Four *One*—Male, age 35 ,, ,, age 24 ,, ,, age 32 ,, ,, age 31	*Three* discharged, well	67·3	Two *One*—Male, age 32 ,, ,, age 31	17·5	None	5
Total...........	3	9	9	59·88	2	17·5	1	12

Altered Diagnosis.

Three cases of *Measles* were sent in as Scarlet Fever.

AVERAGE STAY IN HOSPITAL.

By referring to the list given below, it will be found that the total average stay in Hospital of all Scarlet Fever cases discharged during 1904 was 58·75 days:—

Stay in Hospital—average in days. All cases discharged, or who have died, during 1904.

LIST.	Scarlet Fever		Diphtheria		Enteric Fever		Double Infections		Altered Diagnosis		Deaths—all Diseases		Total average stay in hospital in days
	Cases	Average stay	Cases	Average stay	Cases	Average stay	Cases	Average stay	Cases	Average stay	Number of Deaths	Average life in Hospital	
Withington	28	68·7	8	63·5	2	68·0	1	86·0	......	......	3	19·3	64·6
Moss Side	44	52·9	8	62·5	3	57·0	......	......	......	......	1	2·0	53·6
Levenshulme	16	54·3	4	75·3	1	36·0	2	93·5	......	......	2	9·0	56·4
Bucklow, J. H. B.	83	59·2	11	50·6	3	67·3	5	59·4	3	38·3	5	14·0	56·0
Other Districts	8	59·4	......	......	......	......	1	44·0	1	18·0	......	......	53·7
Private	2	41·5	......	......	......	......	......	......	......	......	......	......	41·5
Totals	181	58·5	31	60·2	9	60·6	9	68·2	4	33·3	11	13·0	56·7

Total discharges, all diseases, 234. Total number of days in Hospital, 13,749. Average, 58·75.

Diseases contracted during stay in Hospital.

Owing to great care on the part of the Nursing Staff, under the direction of the Lady Superintendent of Nurses, and to the very liberal employment of Disinfectors, who have done their work admirably, only a few cases have occurred of patients contracting any disease in hospital.

No case of Diphtheria or Scarlet Fever cross-infection has occurred.

(*a*)—Two children caught *Whooping Cough*, and were kept in on that account for a considerable period, until, being free from the infection of Scarlet Fever, they were sent out at the request (and, as far as the Whooping Cough was concerned, on the responsibility) of the parents. Seeing that when Whooping Cough is combined, in the same child, with another infectious disease, such as Scarlet Fever, the characteristic "whoop" is—so far as my experience goes—completely absent in the *acute* stages of the latter disease, it is difficult to diagnose Whooping Cough occurring in the wards. Any paroxysmal cough, especially if worse at nights, is regarded by me as suspicious, and the case is isolated if possible.

(*b*)—Six children caught *Varicella.* Each case, as it was discovered, was immediately isolated, and eventually cases ceased to occur.

The average duration of stay in hospital is comparatively high, but I think that there are very many factors which go to explain it, amongst them being the following :—

1.—The number of cases under treatment being small, a long stay on the part of a few raises the average enormously.

2.—Some cases must of necessity stay in a long time, as, for example, a case that was admitted with severe eczema of the scalp and neck and part of the body, at the same time as the Scarlet Fever. This case stayed in hospital until all the eczema was quite dry—133 days. Another, from the same district, had profuse double otorrhœa, which resisted treatment for 125 days. Both cases were kept in with the full approval of the Medical Officer of Health for the district concerned.

3.—A considerable number of cases are admitted, as I have mentioned before, having enlarged tonsils and adenoids. Infection necessarily hangs about them for longer periods.

4.—If patients have to be kept indoors, as must happen sometimes, for many consecutive days in the winter time, even though they are in large and well-ventilated wards such as we have the good fortune to possess in this hospital, some accumulation of infection is bound to take place. And again, when the patients do succeed in getting out of doors for a time, the winds are often so cutting that colds and sore throats, and consequent continued infectivity, are contingencies that one is obliged to expect, while using every endeavour to avoid.

5.—Owing to the fact that patients come to this hospital from a number of different districts, and that the District Councils are exceedingly anxious as to the condition of the patients on their return home, I have felt it to be necessary not to discharge the cases until I was satisfied that they were free from infection, believing that the Medical Officer of Health for each district would prefer his patients to stay longer in hospital rather than risk anything through imperfectly-healed sores or imperfectly cured discharges from nose or ears.

The slightest suspicion of definite punctate redness on any portion of the fauces, however small, has been quite sufficient to cause me to refuse to "pass" a patient for discharge.

T. Basil Rhodes.

REPORT BY MR. A. T. ROOK, SUPERINTENDENT OF THE SANITARY DEPARTMENT.

Sanitary Department,
Town Hall, Manchester.

In presenting to the Medical Officer of Health the report of the work transacted in the Sanitary Department for the year ending 30th April, 1904, I beg to state that the City, for inspection and other purposes, is divided into 28 Districts, to each of which one Sanitary Inspector has been assigned.

In addition to these, there is a Superintendent, one Chief Inspector, two Drainage, four Smoke, one Canal Boats and Lodging-house, two Adulteration of Food, six Factory and Workshops Inspectors, including two Female Inspectors, and two Drain Examiners.

There is also a staff of 25 Clerks and one Surveyor for clerical and other work.

In the House Drainage Department there are also six Clerks of Works for supervising and measuring up work done by the contractors employed by the department in carrying out private drainage work.

The number of complaints of nuisances of various kinds made during the year was 47,200, viz.:—

27,104	through the Medical Officer of Health's Department.
2,125	by the Public.
95	through the Police.
17,876	by the Staff.

HOUSES LET IN LODGINGS.

Under the powers given by section 90 of the Public Health Act, the bye-laws made thereunder have been enforced.

The number of houses on the register is 896.

To these, 3,096 day visits and 591 night visits have been paid.

Fifty-seven infringements of the regulations have been reported and dealt with.

One visit has also been paid to an unregistered house, the occupier having previously denied that lodgers were kept.

DAIRIES, MILKSHOPS, AND COWSHEDS REGULATIONS.

Under this Order, which was made in July, 1879, and the Regulations thereunder in 1896, 2,712 milkshops and dairies and 77 cowkeepers are now on the register. The number of cows kept is 1,035. The number of visits to dairies, milkshops, and cowsheds was 3,677. One cowshed has been closed as being unfit for use on sanitary grounds.

Many of the cowsheds have been much improved since last year, but there are still a few in an unsatisfactory condition, and steps are being taken to improve these.

WORKSHOPS, BAKEHOUSES, SHOP HOURS, AND SEATS FOR SHOP ASSISTANTS ACTS.

Shop Hours and Seats for Shop Assistants Acts.

During the year the Acts have been well observed, only a few persons having been reported for infringements.

Workshop Acts.

Much has been done to still further improve the condition of workshops, especially those in which females are employed, and every care has been taken to see that in all cases separate and suitable sanitary accommodation for the sexes has been provided.

Means of escape in case of fire.

With regard to means of escape in case of fire, the whole of the factories and workshops in the City have been inspected, and with very few exceptions are now considered safe.

Periodical changes will, of course, from time to time take place in various ways which will bring buildings within the meaning of the Act, and necessitate the constant supervision of the Inspectors, and action on the part of the authorities.

Bakehouses.

During the year 106 of the worst bakehouses in the City have been absolutely closed, and a number of others have been reported by the Medical Officer of Health to be unfit for use until satisfactory alterations are made to place the premises in a better sanitary condition.

Extensive alterations have been made in many of the bakehouses, and 60 certificates of fitness have been granted.

Out-workers.

Many visits have been paid to houses in various parts of the City in which out-work is carried on, as will be seen on reference to the following tabulated statement, but constant visitation is necessary to maintain the standard of cleanliness which is to be desired, especially in houses in which shirt-making, handkerchief-hemming, brace-making, and umbrella-covering, etc., is done.

The people, as a rule, appear willing to carry out any suggestion made by the Inspectors to keep their houses clean ; but at the same time it is almost impossible for small houses, sometimes containing large families, to be kept in such a satisfactory condition as workshops.

Seats for Shop Assistants Act.

This Act, without the necessity of any legal proceedings, has been complied with by all the shopkeepers of the City.

The work done under the above Acts is shown in the following tables.

Table showing the Work Done by the Inspectors under the Shop Hours, Seats for Shop Assistants, and Factory and Workshop Acts.

Number of District	INSPECTOR	SHOPS — Shop Hours Act					SHOPS — Seats for Shop Assistants Act					WORKSHOPS						OUT-WORKERS			BAKEHOUSES					
		Number of visits	Number of Infringements of Act reported	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register	Number of visits	Number of infringements of Act reported	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register	Number of visits	Number in which Sanitary Defects were found	Number of Reports referred to H.M. Inspector (unregistered factories, &c.)	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register	Number of visits to houses where out-workers are employed	Number of houses found dirty.	Factories and Workshops not provided with proper means of escape in case of fire	Number of visits	Number in which Sanitary defects were found	Number of reports referred to H.M. Inspector of Factories	Number of cases in which Magisterial proceedings have been taken	Number registered during the year	Total number on register
1	Richard Tolson...	29	3	...	4	672	...	...	...	...	194	3438	422	110	4	364	1479	...	...	3	519	31	...	1	8	88
2	Thos. Partington.	26	5	6	5	1048	...	...	...	...	368	3403	370	70	4	222	1108	8	...	9	543	44	1	...	3	177
3	Ernest Bailey ...	8	...	...	...	484	...	...	...	...	190	908	119	34	...	68	965	2	...	1	1758	42	1	...	2	138
4	Francis J. Rowe..	5	...	...	...	534	...	...	...	...	303	1821	164	49	2	125	1134	6	...	2	1574	13	3	...	4	130
...	Emma Coppock..	2105	222	...	148	...	611	...	...	91	...	2462	274	...	16	...	...	752	47	...	...	...	...	...	...	...
...	Margt. L. Brown..	1202	164	5	142	...	451	...	...	80	...	1986	133	...	6	...	...	2370	78	...	...	...	...	...	...	...
...	Totals ...	3375	394	11	299	2738	1062	...	...	171	1055	14018	1482	263	32	779	4686	3138	125	15	4394	130	5	1	17	533

Table showing the number and classification of persons employed as Outworkers by firms within the City, and the number of such firms.

Trades	No. of Employers	No. of Outworkers or Contractors employed
Tailors	184	1003
Shirt-makers	59	960
Dress, Mantle, Costume, &c., Makers	49	506
Underclothing and Pinafores	32	368
Handkerchief Hemmers	18	400
Boot, Slipper, &c., Makers	51	264
Umbrella Trimmers	18	247
Quilt, Cushion, &c., Makers	5	20
Stay and Corset Makers	2	9
Cabinet Makers, Upholsterers, &c.	10	21
Paper-Bag Makers	2	7
Rubber Workers	3	9
Lace Makers	3	8
Optician	1	1
Fur Workers	2	3
Hair Pad and Frame Makers	3	8
Cap Makers	3	6
Belt and Trimming Makers	2	28
Totals	447	3868

Prosecutions for Offences, with Results.

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed £	s.	d.	Amount of Costs ordered to be Paid £	s.	d.	Dismissed or Withdrawn
	Shop	Hours Act							
George W. Eckersley	139, Oxford Street, Chorlton-upon-Medlock	Employing a young person over 74 hours a week	0	5	0	0	5	0	
John Smith	35, Higher Cambridge Street...	Not exhibiting Abstract of Shop Hours Act in shop	0	10	0	0	9	0	
Frederick Piggott ...	91, Gorton Lane, West Gorton	Ditto ...	0	10	0	0	9	0	
John Mitchell	761, Stockport Road	Ditto ...	0	10	0	0	9	0	
George W. Eckersley	139, Oxford Street, Chorlton-upon-Medlock	Ditto ...	0	1	0	0	5	0	
Richard Weiss	63, Bury New Road	Ditto ...	0	5	0	0	5	0	
	Factory and	Workshop Act							
George Neild	17, Piccadilly	Neglecting to ventilate workshop, No. 6, Milk Street, Turner Street, after notice	......			......			Withdrawn (work done)
Richard Abrahams..	15, Jersey Street, Ancoats	Neglecting to cleanse water-closet of workshop after notice	......			0	9	0	Order to abate made
William Henry Sutton	3, Brown Street, City	Neglecting to repair roof of workshop, 51, Oldham Road, after notice	......			......			Withdrawn (work done)
William Asher	125, Elizabeth Street, Cheetham	Neglecting to provide chamber and antechamber to water-closet of workshop, 110, Derby Street, after notice	......			0	3	6	Ditto
		Carried forward ......£	2	1	0	2	14	6	

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed			Amount of Costs ordered to be Paid			Dismissed or Withdrawn
			£	s.	d.	£	s.	d.	
		Brought forward.........	2	1	0	2	14	6	
	FACTORY AND WORKSHOP	ACT—*continued.*							
Julia Williams	11, Churchill Street, Chorlton-upon-Medlock	Refusing admission to the Inspector (house in which outwork is done)	0	2	6	0	5	0	
Barnett Broytman...	48, Waterloo Road, Cheetham.	Neglecting to limewash his workshop after notice	......			......			Withdrawn (work done)
Joseph Sherlock and Sons	12, Dale Street	Neglecting to place water-closet of workshop, 2, Ward Street, Cheetham, in a sanitary condition after notice	......			0	3	6	Ditto
Thomas Brown and Sons	27, Brown Street, City	Not forwarding list of outworkers to Local Authority	1	0	0	0	9	0	
Ditto	103, Ashton Old Road, Ardwick	Ditto ...	1	0	0	0	9	0	
Henry Flint	353A, City Road, Hulme	Ditto	1	0	0	0	9	0	
William Southward..	14, Piccadilly	Ditto	1	0	0	0	9	0	
George Robinson ...	16, Princess Street	Ditto	1	0	0	0	9	0	
Gerrard Griffin	155, Rochdale Road	Ditto	1	0	0	0	9	0	
James A. Goodacre.	6, Riga Street, Shudehill	Ditto	1	0	0	0	9	0	
John Rigby	5, Elbow Street, High Street...	Ditto	1	0	0	0	9	0	
Joseph Sedgwick ...	21, Turner Street	Ditto	1	0	0	0	11	6	
		Carried forward ......£	11	3	6	7	6	6	

PROSECUTIONS FOR OFFENCES, WITH RESULTS—*continued.*

Name of Offender	Address of Offender	Offence	Amount of Fine Imposed			Amount of Costs ordered to be Paid			Dismissed or Withdrawn
			£	s.	d.	£	s.	d.	
		Brought forward	11	3	6	7	6	6	
	FACTORY AND WORKSHOP	ACT—*continued*							
C. & A. Simmons & Co.	22, Back Piccadilly..............	Not forwarding list of outworkers to the Local Authority	1	0	0	0	9	0	
Hannah Wilson......	104, Woodward Street	Ditto	0	5	0	0	7	6	
Atkinson Gould & Co.	51, High Street	Ditto		......		0	3	6	Withdrawn
Henry Barlow	23–25, Pollard Street	Ditto		......		0	3	6	Ditto
S. & W. Griffiths ...	2, Swan Lane, City..............	Ditto		......		0	3	6	Ditto
Kate Huscroft	10, Turkey Lane.................	Ditto	0	1	0	0	2	6	
James Murray	87, Piccadilly	Ditto		......		0	3	6	Withdrawn
Samuel Quinn	428–430, Rochdale Road	Ditto		......		0	3	6	Ditto
Harry Randall	35, Oldham Street	Ditto		......		0	3	6	Ditto
Thomas Roberts ...	229–231, Queen's Road.........	Ditto		......		0	3	6	Ditto
Royle & Fingue ...	65, Market Street	Ditto		......		0	3	6	Ditto
Solomon Wilkins ...	8, Peel Street, City..............	Ditto		......		0	6	0	Ditto
		Total	12	9	6	9	19	6	

SMOKE NUISANCES.

For the abatement of smoke nuisances, the four Inspectors appointed specially for this work have taken 627 timed observations of half-an-hour each, with the result that 133 notices for the abatement of nuisances have been served. Proceedings before the Magistrates have been ordered in 162 cases out of 228 offences reported. These cases were disposed of as follows :—

One hundred and fifty-two were summoned before the Justices, in 113 of which fines were imposed amounting to £239 19s. 6d., and costs £63 5s. One was ordered to pay costs only.

Thirty-nine orders of abatement were granted and served, 4 cases were excused, dismissed, or withdrawn. (In four cases fines were imposed in addition to orders of abatement being granted.)

Much attention during the past year, as will be seen by the above, has been given to the nuisance caused by the emission of black smoke, not only from the furnaces connected with boilers in mills, warehouses, and other works, but also from chemical and other industries, and the efforts made have already resulted in a considerable reduction of the nuisance. It may be stated that representations have been made to other Authorities on the North-East and West sides of the City in regard to the great pollution of the air of the City by the excessive emission of smoke from the chimneys in their districts.

SALE OF FOOD AND DRUGS ACTS AND MARGARINE ACT.

Under these Acts, the two Inspectors specially appointed have purchased for analysis 1,736 samples. Of these, 43 were adulterated, viz. :—

Butter	5
Milk	27
Pepper	2
Spirits	9

Forty summonses were issued. In 35 cases fines were imposed amounting in the aggregate to £92 14s., with costs £65 8s. 10d. One person was ordered to pay costs only.

Four summonses were dismissed or withdrawn.

Appended are tables showing the result of the action taken under the Acts since 1873.

Showing the number of Articles of Food and Drugs procured for Analysis, the number Adulterated, the number informally purchased or in which no proceedings were taken, and the number of cases in which Magisterial Proceedings were taken, together with the Decisions and the Total Amount of Fines imposed from May 1st, 1873, to April 30th, 1904.

Article	No. Procured	No. Adulterated	No. informally purchased or in which no proceedings were taken	No. Summoned before Magistrates				Total Amount of Fines Imposed		
				No. Summoned	No. Fined	No. of Warrants granted	No. ordered to pay Costs only—Dismissed or Withdrawn	£	s.	d.
Arrowroot	6	...	...	...	...	...	...	......		
Bacon	1	...	...	...	...	...	...	......		
Baking Powder	41	...	...	...	...	...	...	......		
Beef Dripping	3	...	...	...	...	...	...	......		
Beer	504	72	34	38	19	...	19	38	0	0
Bread	1138	39	7	32	32	...	...	119	10	0
Butter	2438	370	27	343	273	3	67	478	16	6
Buttermilk	2	2	2	...	...	...	...	......		
Camphorated Oil	5	...	...	...	...	...	...	......		
Cheese	243	10	4	6	5	...	1	15	0	0
Chicory	43	...	...	...	...	...	...	......		
Cider	3	...	...	...	...	...	...	......		
Cocoa	39	...	...	..	...	...	...	......		
Cod Liver Oil	6	...	...	...	...	...	...	......		
Coffee	592	40	2	38	37	...	1	57	15	6
Confectionery	327	2	...	2	2	...	...	10	0	0
Cream	14	...	...	...	...	...	...	......		
Drugs	426	10	9	1	1	...	...	0	5	0
Fish (tinned)	7	...	...	...	...	...	...	......		
Flour	172	...	...	...	...	...	...	......		
Fruit (tinned)	2	...	...	...	...	...	...	......		
Jams	274	1	...	1	1	...	...	1	0	0
Jelly	2	...	...	...	...	...	...	......		
Ketchup	1	...	...	...	...	...	...	......		
Lard	741	27	5	22	18	...	4	44	3	6
Margarine	147	...	..	...	...	...	...	......		
Meats (tinned)	9	...	...	...	...	...	...	......		
Milk	21608	1524	24	1500	1026	.	474	3011	7	0
Milk (skimmed)	151	23	...	23	18	...	5	39	1	6
Milk (condensed)	9	...	...	...	...	...	...	......		
Mineral Waters, &c.	278	79	76	3	...	...	3	......		
Carried forward	29232	2199	190	2009	1432	3	574	3814	19	0

ANALYSIS—*continued.*

Article	No. Procured	No. Adulterated	No. informally purchased or in which no proceedings were taken	No. Summoned before Magistrates: No. Summoned	No. Fined	No. of Warrants granted	No. ordered to pay Costs only—Dismissed or Withdrawn	Total Amount of Fines Imposed £	s.	d.
Brought forward	29232	2199	190	2009	1432	3	574	3814	19	0
Mustard..	365	46	6	40	34	..	6	19	4	0
Oatmeal.................	172	...	...	...	...	...	...	......		
Olive Oil	12	1	...	1	1	...	...	0	2	6
Pearl Barley	1	...	...	...	...	...	...	......		
Pepper	661	7	...	7	6	...	1	12	7	6
Pickles	4	...	...	...	...	...	...	......		
Porter	8	...	...	...	...	...	...	......		
Rice, Tapioca, &c.......	115	...	...	...	...	...	...	......		
Shrimps	8	4	4	...	...	...	...	......		
Spices	279	1	...	1	...	...	1	......		
Spirits	1265	59	10	49	45	...	4	102	7	0
Sugar....................	65	...	...	...	...	...	...	......		
Tea	407	...	...	...	...	...	...	......		
Treacle & Golden Syrup	62	10	7	3	2	...	1	2	0	0
Tripe	1	...	...	...	...	...	...	......		
Vegetables (tinned) ...	17	9	8	1	...	...	1	......		
Vinegar.................	127	8	...	8	7	...	1	2	10	6
Wines	35	...	...	...	...	...	...	......		
Totals............	32836	2344	225	2119	1527	3	589	3953	10	6

Other Offences against the Acts.

Offence	No. Summoned	No. Fined	No. Dismissed or Withdrawn	Total amount of Fines imposed £	s.	d.
Refusing to serve Inspector with Samples of Food	22	22	...	73	2	6
Giving False Warranty	18	6	12	46	0	0
Obstructing Inspector in the execution of his duty..	2	1	1	5	0	0
Selling Milk from a vehicle which had not the name and address of the person inscribed thereon	5	5	...	1	0	6
Selling Margarine in an unstamped wrapper..................................	2	2	...	0	3	6
Totals.....................	49	36	13	£125	6	6

Total amount of Penalties for Adulteration..............	£3,953	10	6
Total amount of Penalties for Other Offences...........	125	6	6
Grand Total.........	£4,078	17	0
Total amount of Penalties against Farmers...............	£1,900	16	0

Showing the number of persons summoned more than once under the Adulteration of Food and Drugs and Margarine Acts from May 1st, 1873, to April 30th, 1904.

MILK DEALERS.

No.	Article	1st Offence	2nd Offence	3rd Offence	4th Offence	In County (Salford)
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1	Milk.	0 5 0 *8 W*	Withdrawn *10 W*	1 0 0 *16 W*	......	......
2	Do	10 0 0 *60 F*	10 0 0 *11½ F*	......	......	......
3	Do	10 0 0 *66 F*	5 0 0 *64 F*	1 0 0 *9½ W*	5 0 0 (*Skimmed Milk*) *8 W*	10 0 0 2 0 0 1 0 0 5 0 0
4	Do	0 10 0 *6½ W & 5 F*	2 0 0 *9 W*	......	......	......
5	Do.	3 0 0 (Refusing)	10 0 0 *9 W*	5 0 0 *56 F*	......	......
6	Do.	2 0 0 *11 W*	2 cases Withdrawn (Farmer fined) *20 F each*	2 0 0 *10 W & 17 F*	5 0 0 *44 F*	......
7	Do.	2 0 0 *5 W*	Withdrawn *11½ W*	6 0 0 *1½ W & 15 F*	10 0 0 *2 W & 33 F*	......
8	Do.	3 0 0 *10 W & 25 F*	1 0 0 *5 W*	......	......	......
9	Do.	1 1 0 *24 W*	1 1 0 *30 F*	......	......	......
10	Do.	1 0 0 *10 W*	5 0 0 (Refusing)	15 0 0 *30 W*	......	......
11	Do.	2 0 0 (Refusing)	Withdrawn (Farmer fined) *8 F*	2 10 0 *12 W*	5 0 0 *8 W*	......
12	Do.	2 0 0 *10 W*	Withdrawn (Farmer fined) *7 W*	2 0 0 *5 W*	......	......
13	Do.	1 0 0 *40 F*	1 0 0 *7 W*	5 0 0 (Refusing)	......	......
14	Do.	1 1 0 *8½ W*	5 0 0 *14 W*	2 0 0 *12 W*	1 10 0 *8 W*	2 0 0 20 0 0
15	Do.	10 0 0 *20 W*	5 0 0 *13 W*	5 0 0 *10 W*	......	......

The figures in *Italic* denote the percentage of water added and fat abstracted.

No.	Article	1st Offence	2nd Offence	3rd Offence	4th Offence	5th Offence	6th Offence	7th Offence	8th Offence	9th Offence	10th Offence	In County
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
				Heard same day								
16	Milk	4 0 0 *7 W*	10 0 0 *4½ W*	20 0 0 *10 W*	Dis-missed *9½ W*	Dis-missed *8 W*	...	...	..	...	...	15 0 0 (Strange-ways)
		Heard same day		*Heard same day*								
17	Do.	5 0 0 *12 W*	Costs only *26 W*	Dis-missed *4½ W*	Dis-missed *6½ W*	3 0 0 *10½ W*	3 0 0 *11½ W*	...	...	...	...	...
18	Do.	10 0 0 *33 F*	2 cases 20 0 0 *28 F* *28 F*	...	...	...	...	...	.	...	...	...
19	Do.	15 0 0 (In 2 cases) *20 F* *20 F*	15 0 0 (In 3 cases) *4½ W* *5 W* *8 W*	...	...	...	...	...	...	...	Hanley, Staffs.	40 0 0 (In 4 cases)
20	Do.	2 cases Dis-missed *4 W & 8 W*	Dis-missed *10 W*	...	...	...	...	...	...	...	...	2 0 0 Gorton *8 W*
21	Do.	2 0 0 (In 3 cases) *6 W* *4 W* *10 W*	4 0 0 (In 2 cases) *8 F* *13 F*	...	...	...	...	...	...	...	...	...
22	Do.	5 0 0 *7½ W*	2 0 0 (In 2 cases) *28 F* *10 F*	...	...	...	...	...	...	...	...	...
23	Do.	10 0 0 (In 2 cases) *10 W* *4½ W*	1 0 0 (In 4 cases) *16 F* *45 F* *30 F* *31 F*	...	...	...	...	...	...	...	...	...
24	Do.	2 0 0 *8 W*	10 0 0 *10 W*	5 0 0 (Refus-ing)	...	...	..	...	...	...	...	...
25	Do.	2 0 0 *4½ W*	2 0 0 (In 2 cases) *9½ W* *6 W*	...	...	...	...	...	...	...	...	...
26	Do.	4 0 0 (In 2 cases) *28 F* *33 F*	10 0 0 (In 2 cases) *10 F* *10 W*	...	...	...	...	...	...	...	...	...
27	Do.	15 0 0 *30 W*	20 0 0 *39 W*	10 0 0 (Refus-ing)	10 0 0 (Refus-ing)	10 0 0 *14 W*	5 0 0 (Refus-ing)	20 0 0 *14 W*	20 0 0 *12 W*	10 0 0 *15 W*	10 0 0 *8 W*	20 0 0 (Strange-ways)
28	Do.	2 0 0 *12 F*	5 0 0 *4½ W* *15 F*	...	...	...	...	...	...	...	...	...

The figures in *Italic* denote the percentage of water added and fat abstracted.

FARMERS—*continued.*

No.	Article	1st Offence	2nd Offence	3rd Offence	4th Offence	5th Offence	6th Offence	7th Offence	8th Offence	9th Offence	10th Offence	In County
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
29	Milk	2 0 0 (In 2 cases) *20 W* *29 W*	2 0 0 *23 W*	...	...	...	...	...	...	...	...	...
30	Do.	4 0 0 (In 2 cases) *7 W* *10 W*	5 0 0 (In 2 cases) *8 W* *8 W*	...	...	...	...	...	...	...	...	...
31	Do.	5 0 0 *20 F*	5 0 0 *13 W*	...	...	...	...	...	...	...	...	...
32	Do.	1 0 0 *10 F*	5 0 0 *20 F*	10 0 0 *6 W*	2 cases 5 0 0 *10 W* *6 W*	5 0 0 *12 F*	2 0 0 *6 W*	...	...	...	...	...
33	Do.	3 0 0 *12½ W*	5 0 0 *8 W*	...	...	...	...	...	...	...	...	...
34	Do.	15 0 0 (In 3 cases) *7 W* *12 W* *11 W*	10 0 0 *20 W*	...	...	...	...	...	...	...	...	...
35	Do.	2 0 0 *10 F* *Heard same day*	5 0 0 *11 W*	5 0 0 *11 W*	3 cases 20 0 0 *11 W* *15 W* *15 W*	...	...	...	...	...	Altr'nc-ham Salford Do.	Dis-missed 2 0 0 2 0 0
36	Do.	15 0 0 *17 W*	5 0 0 *17 W*	...	...	...	...	...	...	...	Salford L'pool Do.	10 0 0 10 0 0 10 0 0
37	Do.	10 0 0 (In 2 cases) *44 F* *25 F*	5 0 0 *8½ W &* *7 F*	...	...	...	...	...	...	...	...	...
38	Do.	2 cases 5 0 0 5 0 0 *7 W* *10 W*	2 cases 10 0 0 10 0 0 *16 W* *13 W*	...	...	...	...	...	...	...	...	...
39	Do.	2 cases 1 0 0 1 0 0 *17 F* *20 F*	10 0 0 *7 W*	...	...	...	...	...	...	...	...	...
40	Do.	2 cases 2 0 0 2 0 0 *7 W* *3 W*	2 0 0 *6 W*	...	...	...	...	...	...	...	...	...
41	Do.	3 cases 5 0 0 5 0 0 5 0 0 *6 W* *10 W* *11 W*	2 0 0 *21 F*	...	...	...	...	...	...	...	...	...
42	Do.	1 0 0 *7 W*	Dis-missed *7 W &* *14 F*	...	...	...	...	...	...	...	...	...

The figures in *Italic* denote the percentage of water added and fat abstracted.

Butter Cases.

No.	1st Offence	2nd Offence	3rd Offence	4th Offence
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
43	Costs only July 19th, 1878 (Butterine)	2 0 0 Dec. 7th, 1887 (Butterine)	Withdrawn Jan. 11th, 1893 (Excess Water) *10 per cent.*	Withdrawn Jan. 11th, 1893 (Excess Water) *8½ per cent.*
44	2 0 0 Jan. 13th, 1886 (Butterine)	1 0 0 Dec. 7th, 1887 (Butterine)	....	....
45	2 0 0 April 16th, 1884 (Butterine)	2 0 0 Jan. 15th, 1886 (Butterine)	Costs only Jan. 10th, 1894 (Packet not marked Margarine)	....
46	2 0 0 April 16th, 1884 (Butterine)	3 0 0 Dec. 22nd, 1886 (Butterine)	3 0 0 March 5th, 1890 (Margarine)	3 0 0 March 5th, 1890 (Margarine)
47	2 0 0 May 21st, 1884 (Butterine)	5 0 0 Jan. 13th, 1886 (Butterine)	5 0 0 Dec. 7th, 1887 (Butterine)	....
48	0 10 0 Dec. 7th, 1887 (Butterine)	Dismissed March 14th, 1894 (Excess Water) *6 per cent.*	Dismissed March 14th, 1894 (Excess Water) *5½ per cent.*	....
49	2 0 0 March 31st, 1886 (Butterine)	1 1 0 May 2nd, 1888 (Margarine)	....	....
50	Dismissed April 8th, 1885 (Butterine)	2 0 0 Dec. 7th, 1887 (Butterine)	....	....
51	Do.	Do.	....	....
52	2 0 0 April 16th, 1884 (Butterine)	10 0 0 Nov. 13th, 1889 (Margarine)	....	....
53	1 1 0 Dec. 7th, 1887 (Butterine)	2 0 0 April 17th, 1889 (Margarine)	....	....
54	5 0 0 March 21st, 1888 (Margarine)	Withdrawn Jan. 11th, 1893 (Excess water) *9 per cent.*	Withdrawn Jan. 31st, 1903 (Excess water) *3 per cent.*	....
55	0 5 0 March 13th, 1889 (Margarine)	Dismissed Jan. 23rd, 1894 (Excess Water) *11½ per cent.*	....	....
56	0 5 0 Oct. 3rd, 1888 (Margarine)	Dismissed March 14th, 1894 (Excess Water) *7 per cent.*	....	....

The figures in *Italic* denote the percentage of water added and fat abstracted.

Butter Cases—*continued*

No.	1st Offence	2nd Offence	3rd Offence	4th Offence
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
57	1 0 0 Nov. 23rd, 1892 (Margarine)	2 0 0 Oct. 20th, 1897 (Margarine)	5 0 0 March 8th, 1899 (Foreign Fat) *80 per cent.*	....
58	1 0 0 Nov. 21st, 1894 (Margarine)	10 0 0 July 26th, 1899 (Margarine)	....	....
59	2 0 0 April 1st, 1896 (Margarine)	3 0 0 Dec. 1st, 1897 (Margarine)	5 0 0 Dec. 10th, 1902 (Margarine)	5 0 0 Jan. 7th, 1903 (Margarine)

The figures in *Italic* denote the percentage of water added and fat abstracted

CANAL BOATS ACTS.

The number of canal boats on the register is 480.

The number of inspections made was 1,854, resulting in five infringements of the Act being discovered, which were referred to the Justices to be dealt with; and fines were imposed amounting to £1 13s. 6d., with costs £1 15s. 6d.

Fifty-four caution notices were sent to the owners and masters

OFFENSIVE TRADES.

The number of offensive trades on the register is 709. These have been placed under close supervision, and periodical visits paid.

UNHEALTHY DWELLINGS.

During the year, 666 houses were certified to be dealt with by the Sanitary Committee.

Of these, 589 were ordered to be closed.

In the majority of these the owners arranged to make alterations to meet the requirements of the Corporation.

PARTICULARS RELATING TO THE OPERATIONS OF THE CLEANSING DEPARTMENT.

Cleansing Department,
Town Hall, Manchester,
June 28th, 1905.

Dear Sir,—There are within the City:* pail-closets, 67,548; ash-boxes, 74,450; midden-privies, 16,713; wet middens, 8,739; dry middens, 667; water-closets, 54,326; and cesspools, 74. The pail-closets are systematically emptied at regular intervals—once, twice, or thrice weekly, as necessity demands. The midden-privies are emptied as required. The contents of the pail-closets are taken to Holt Town and Water Street. At Holt Town the fæcal matter is dried into concentrated manure. The dry refuse is consumed in the Galloway boilers, and generates the steam required for working the machinery. The worthless fine ash, which cannot be consumed, is deposited at the nearest tip at Clayton Vale. The privy refuse and fæcal matter, which is taken to Water Street, is sent away in its crude state as nightsoil to Carrington and Chat Moss Estates and to farmers in Cheshire. Dry combustible matter is passed into the destructor furnaces or under the Galloway boilers at Water Street, and there destroyed. A large quantity of fine ash at Water Street is used as an absorbent for the fæcal matter from the pail-closets.

The market garbage, of which we have 5,912 tons per annum, is carted to Water street, and destroyed in the furnaces. Slaughter-house refuse is collected from the abattoirs and private slaughter-houses and sent to Holt Town, where it is passed through dryers, and the dry material is then added to the concentrated manure. Street sweepings are generally deposited at the nearest depôt, and after being allowed to drain are carted to the nearest tip, or to the Water Street Depôt, from whence they are sent away by boat to farmers or the Committee's Estates. The total quantity of material collected by this Department during the past year amounted to 353,399 tons.

We have within the City about 41 destructor furnaces of various kinds, and last year 11,204 tons of mortar was made from the clinker obtained from such furnaces.

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*Inclusive of the District of Moss Side.

We employ about 49 "orderly" youths and men, who collect horse-droppings and litter from the streets, and deposit the same in the bins fixed in the footpaths. The contents of the bins are removed twice daily, and taken to the nearest depôt.

Acting upon instructions received from you, special pails and lids are supplied for all cases of Enteric Fever; labels are attached to the pails asking the occupants to use disinfectants, which are supplied with the pails; the pails are left in the yard, and not placed in the ashplace. The occupants of the houses are requested to use this special pail for the reception of the fæcal matter and washings from the patient only. The pails are removed in a specially-constructed vehicle, and taken to Holt Town Depôt, where the contents are destroyed.

With regard to the cleansing of passages, we have a staff of about 34 men engaged specially upon this work. They regularly, at least once a week, cleanse the back passages in certain districts, and during last year 348,130 swillings and cleansings were effected in courts and passages.

During the year, 62,725 barrels of water were used in degging the streets, and 296,277 grids were unstopped.

During the past 14 years, we have deposited upon the various tips within the City the following quantities of material, viz.:—In 1892, 99,866 tons; 1893, 109,078 tons; 1894, 103,949 tons; 1895, 113,836 tons; 1896, 107,883 tons; 1897, 99,658 tons; 1898, 96,635 tons; 1899, 104,481 tons; 1900, 95,138 tons; 1901, 64,781 tons; 1902, 117,619 tons; 1903, 180,985 tons; 1904, 141,999 tons; and in 1905, 118,093 tons. The bulk of this material was deposited on the tips at Clayton and Harpurhey. It is composed principally of dry ashes, street sweepings, and bell-dust. Occasionally the contents of dry middens are sent there. During last year 15,620 tons of material was sent to Carrington Estate and 56,978 to Chat Moss Estate.

Yours faithfully,

R. Williamson,

Superintendent.

Dr. Niven,

Medical Officer of Health,

Town Hall, Manchester.

DEPARTMENT OF MEAT INSPECTION.

City Abattoirs,
Manchester,
March 22nd, 1905.

Dr. Niven,
Medical Officer of Health,
Town Hall.

Dear Sir,—I have pleasure in submitting the following report with reference to work done, and the amount of unwholesome food seized and destroyed under the Public Health Acts, 1875 and 1890, during the year ending December 31st, 1904:—

Abattoirs and Carcase Market.

The number of animals slaughtered in the Abattoirs, Water Street, during the 12 months:—

Cattle	Sheep	Lambs	Calves	Pigs
27,415	106,176	51,139	1,627	15,769

The number of carcases exposed for sale in the Dead Meat Market, Water Street:—

	Beasts	Sheep	Lambs	Calves	Pigs
Abattoir killed ...	24,551	100,049	49,365	409	2,982
Imported: Fresh ...	38,463	54,256	271	15,668	21,223
Imported: Chilled & Frozen	14,664	185,757	39,244	565	25,036
Total	77,678	340,062	88,880	16,642	49,241

Offals.

Beast, Sheep, and Pig Offals:—

Imported and exposed in the Meat Market { Fresh ... . 945,600lbs.
Chilled and Frozen 1,406,850lbs.

Rusholme Abattoirs.

The number of animals slaughtered at the Abattoirs, Monmouth Street, Rusholme:—

Beasts	Sheep and Lambs	Calves	Pigs
667	7,795	222	3,354

Private Slaughter-houses.

The amount of slaughtering executed in the private slaughter-houses is approximately estimated in the following figures:—

	Cattle	Sheep and Lambs	Pigs
Beef Butchers	8,672	40,092	—
Pork ,, ...	—	—	21,840

Unsound Food.

The amount of unwholesome food condemned during the year is summarised in the following tables :—

Meat and Fish.

Beef	307,695 lbs.
Mutton	9,848 ,,
Veal	6,395 ,,
Pork	27,355 ,,
(Imported Offals)	29,640 ,,
Venison	410 ,,
Total	381,343 lbs.

Fish	157,682 lbs.
Shellfish	31,539 ,,
Total	189,221 lbs.

Game and Rabbits.

Ptarmigan	105 brace
Partridge	78½ ,,
Guinea Fowl	16½ ,,
Quails	66 head
Rooks	189 ,,
Grouse	16 ,,
Capercalzies	8 ,,
Pheasants	1 ,,
Hares	49 ,,
,,	3 cases
Rabbits	3,412 head

Poultry.

Chickens	139 head
Geese	79 ,,
Pigeons	59 ,,
Ducks	56 ,,
Turkeys	36 ,,

Fruit.

Strawberries	525 boxes 29 baskets
Black Currants	115 trays
Black Currants	14 half sieves
Red Currants	4 sieves
Pears	57 barrels 17 cases
Tomatoes	55 boxes 17 crates
Grapes	10 barrels
Bananas	7½ crates
Apples	7 barrels 3 half barrels
Blackberries	2 casks
Bilberries	1 basket
Cherries	1 sieve

Vegetables.

Mustard and Cress	385 baskets
Potatoes	318 bags
Cauliflowers	55 crates
Turnips	87 bags 22 half bags
Lettuce	42 pots
Water Cress	24 baskets
Onions	18½ pots
Mushrooms	9 baskets
Sprouts	7 bags
Radishes	2 hampers
Cabbage	1 crate
Asparagus	1 crate
Cucumbers	1 flat

Miscellaneous.

Cheeses	12
Yeast	3 hampers
Eggs	5 cases

Number of Seizures and reasons therefor.

The number of carcases, portions of carcases, and consignments of fish, etc., condemned during the year has been 2,320, and from the following causes :—

Decomposing	1,354	Bone Taint	200
Tuberculosis	245	Unmarketable	156
Parasites	56	Sarcoma	2
Smothered	55	Pericarditis	2
Emaciation	78	Septicæmia	2
Inflammation	44	Milk Fever	2
Injured	20	Blood Poison	1
Dropsy	17	Strangulation	1
Fever	16	Metritis	1
Abscesses	13	Heart Disease	1
Actinomycosis	8	Jaundice	1
Anthrax	5	Angioma	1
Hydatids	5	Hoose	1
Pleurisy	4	Swine Erysipelas	1
White Scour	4	Joint Disease	1
Black quarter	4	Mammitis	1
Choked	4	Purpura	1
Congestion	4	Purpural Spotted	1
Fatty Degeneration	3	Œdema	1
Asphyxia	3	Pneumonia	1

The following table will show where the meat and fish were condemned, and the amounts taken from each place :—

In the Abattoirs and Carcase Market (of which 179,164 lbs. was dressed meat consigned from other places than the City.)	234,609	lbs.
„ Pig Market	13,544	„
„ Railway Stations	9,926	„
„ Private Slaughter-houses	2,017	„
„ Triperies	4,717	„
„ Shops	1,816	„
„ Farms	532	„
„ Rusholme Abattoirs	191	„
„ Hawkers' Carts	235	„
„ Campfield Market	27	„
At an Office	20	„
In the Crumpsall Workhouse	12	„
„ Cold Air Stores	120,257	„
„ Fish Markets	182,661	„

The game, rabbits, poultry, fruit, vegetables, and miscellaneous :—

At Fish Market.

Ptarmigan	105	brace
Partridge	78½	,,
Guinea Fowl	16½	,,
Rooks	189	head
Quails	66	,,
Grouse	16	,,
Capercalzies	8	,,
Pheasants	1	,,
Chickens	139	,,
Pigeons	59	,,
Geese	64	,,
Ducks	56	,,
Turkeys	16	,,
Hares	49	,,
Rabbits	3,293	,,
Mushrooms	2	baskets

At Smithfield Market.

Rabbits	71	head
Turkeys	20	,,
Geese	15	,,
Strawberries	525	boxes
	10	baskets
Black Currants	112	trays
	14	half sieves
Red Currants	4	sieves
Pears	57	barrels
	16	cases
Tomatoes	55	boxes
	17	crates
Apples	3	barrels
Blackberries	2	casks
Bilberries	1	basket
Bananas	1	crate
Cherries	1	seive
Mustard and Cress	385	baskets
Cauliflowers	55	crates

Turnips	21	bags
	22	half bags
Sprouts	7	bags
Mushrooms	7	baskets
Onions	4	pots
Cabbage	1	crate
Cucumber	1	flat
Radishes	1	hamper

At Railway Stations.

Turnips	66	bags
Lettuce	42	pots
Watercress	24	baskets
Onions	14½	pots
Asparagus	1	crate
Radishes	1	hamper
Grapes	8	barrels
Pears	1	case
Cheeses	12	
Yeast	3	hampers
Eggs	1	half case

At Warehouses.

Potatoes	318	bags
Eggs	4½	cases

On Hawkers' Carts.

Strawberries	19	baskets
Bananas	6½	crates
Apples	4	barrels
	2	half barrels
Blackberries	3	trays

At Cold Air Stores.

Hares	3	cases

Shops.

Rabbits	48	head
Grapes	2	barrels
Apples	1	half barrel

With the exception of 1,472 lbs. of fish, 489 lbs. of beef, 27 lbs. of bacon, and 11 rabbits, the whole of the above amounts have been surrendered* by the trade after being condemned by the Inspectors.

* The term surrender includes cases in which the Inspector has discovered the diseased meat in the course of his duty.

Of the large amount of meat condemned at the Cold Air Stores, 112,654 lbs. was frozen meat consigned to the stores in an unsound condition.

In addition to the supervision of abattoirs and other markets, there have been 1,997 visits made to private slaughter-houses (85 being at the request of the butchers) and 9,338 carcases examined in them. Of these, 74 whole carcases and portions of 7 others were condemned as unfit for human food; (comprising 67 pig carcases, 4 sheep, 3 beast, and portions of 7 other carcase).

There have been 5,845 visits made to the meat, fish, fruit, and provision shops in the poorer districts of the city. Of these, 330 were made on Sunday mornings.

Twenty-five shopkeepers have been cautioned for having small amounts of unsound food in their possession, three being on Sunday mornings.

The triperies and sausage and pie factories have been regularly inspected, but nothing of an objectionable nature was discovered.

Eighty-six visits have been made to the railway stations, with a view to ascertain what consignments of meat and fish are consigned direct to shops, and not coming to our markets for inspection.

Seven orders for the destruction of unwholesome food have been obtained at the City Police Courts.

There have been three prosecutions under section 116 of the Public Health Act, 1875, for exposing for sale unwholesome food, and fines amounting to £15 and costs imposed.

Fifteen hundred and twenty official certificates have been granted (upon request) to the meat and fish salesmen of the markets for the purpose of being forwarded to the consignors as a guarantee of what has been condemned.

ALFRED HOLBURN,

Chief Inspector.

CONTAGIOUS DISEASES OF ANIMALS.

Duting the year there have been eight outbreaks of glanders in the city, twelve horses being affected with the disease, and nine slaughtered. The total value was £176, one-fourth of which was paid to the owners as compensation under the Glanders and Farcy Order of 1894. The three other horses having died, no compensation was paid.

One outbreak of swine fever has occurred, and has been dealt with by the Board of Agriculture and Fisheries.

Five cases of anthrax have been discovered by the Inspectors, four of which were in carcases sent to the City Abattoirs from country districts and one at a farm within the city, and the circumstances in each case have been reported to the Board of Agriculture and Fisheries and to the Local Authorities at the various places from which the carcases were sent.

Twenty-four outbreaks of parasitic mange in horses have been dealt with by the Inspectors under the Manchester (Parasitic Mange) Order of 1903.

There have been two prosecutions against owners of horses for neglecting to notify the existence of glanders or parasitic mange in their stables, and fines amounting to £6 and costs imposed.

The Pig Market has been visited daily by a Veterinary Inspector under the Swine Fever Order, 1894, all cases of infringement of such Order being immediately reported to the Board of Agriculture and Fisheries, or dealt with by the Inspectors.

Three hundred and seventy visits have been made to the Railway Stations and Cattle Docks for the purposes of the Animals (Transit and General) Order of 1895.

The Horse Market has been visited each month by a Veterinary Inspector, as required by the Glanders and Farcy Order, 1894.

ALFRED HOLBURN, M.R C.V.S

Chief Veterinary Inspector.

TABLES.

TABLE A.—MANCHESTER, 1904.

Causes of Death at Different Life Periods in the 52 weeks of the year.

PERSONS.—(MALES AND FEMALES.)

CAUSES OF DEATH	Ages at Death													
	All Ages	Under 5 Years: 0 to 1	Under 5 Years: 1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
All Causes	11666	3240	1741	281	144	203	274	649	939	1074	1371	1135	530	85
A.—General Diseases	4745	1527	991	153	75	115	151	334	436	406	347	162	44	4
B.—Local Diseases	5595	1098	655	106	58	74	108	283	453	613	954	825	323	45
C.—Other Specified Dis. :	10	3	...	...	...	...	...	2	2	1	2	...	...	...
D.—Ill-defined Diseases	909	533	36	1	1	...	...	1	2	1	25	122	153	34
E.—Violent Deaths	407	79	59	21	10	14	15	29	46	53	43	26	10	2
A.—General Diseases.														
Smallpox.. Vaccinated	3	...	...	...	...	...	1	1	...	1	...	...	...	...
Smallpox.. Not Vaccinated	5	1	...	...	...	1	1	2	...	...	...	...	...	...
Smallpox.. No Statement	1	...	...	...	...	...	1	...	...	...	...	...	...	...
Cowpox	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Chickenpox	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Measles	425	82	328	14	1	...	...	...	...	...	...	...	...	...
Epidemic Rose Rash	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Scarlet Fever	85	9	49	17	7	...	...	1	1	1	...	...	...	...
Typhus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Plague	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Relapsing Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Influenza	97	5	8	3	1	2	2	8	14	9	22	17	6	...
Whooping Cough	280	121	148	11	...	...	...	...	...	...	...	...	...	...
Mumps	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Diphtheria and Memb : Croup	99	10	56	27	5	1	...	...	...	...	...	...	...	...
Cerebro-spinal Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Simple Cont : Fever	1	...	...	...	...	...	...	...	...	...	...	...	1	...
Enteric Fever	66	...	3	3	2	9	11	12	17	6	3	...	...	...
Asiatic Cholera	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Epidemic Diarrhœa	607	472	176	1	...	1	...	...	2	1	1	2	...	1
Diarrhœa	151	117	28	2	...	...	...	...	...	...	...	2	2	...
Dysentery	3	2	...	...	...	...	...	...	...	1	...	...	...	...
Malarial Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hydrophobia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Glanders	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Anthrax	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tetanus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Syphilis	48	40	3	...	...	...	...	2	1	1	1	...	...	...
Gonorrhœa, Strict : Urethra	10	...	...	...	...	...	...	1	...	3	4	2	...	...
Puerperal.. Septicæmia	17	...	...	...	...	...	3	10	4	...	...	...	...	...
Puerperal.. Pyæmia	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Puerperal.. Phlegmasia Dol :	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Puerperal.. *Fever*	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Infective Endocarditis	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Epidemic Pneumonia / Pneumonic Fever	3	...	...	2	...	...	...	...	...	...	1	...	...	...
Erysipelas	27	11	1	...	...	...	...	2	1	3	5	3	1	...
Septicæmia (not puerp :)	10	2	2	...	...	...	2	1	1	2	...	...	...	...
Pyæmia (not puerp :)	7	4	1	...	1	...	1	...	...	...	...	...	...	...
Phlegmon	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Phagedœna	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Other Septic Diseases	13	2	2	2	1	...	1	1	1	1	2	...	...	...
Tubercular Phthisis	1045	7	19	17	21	67	106	217	248	204	109	28	2	...
Phthisis	61	...	...	3	2	7	3	19	14	6	5	2	..	...

TABLE A, 1904—*continued.*

CAUSES OF DEATH	All Ages	Under 5 Years: 0 to 1	Under 5 Years: 1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
A.—General Diseases— *continued*														
Tubercular Meningitis	147	37	74	21	7	1	4	1	1	1	...	...	...	...
Tubercular Peritonitis	41	12	12	7	6	2	...	1	...	...	1	...	...	...
Tabes Mesenterica	43	28	12	2	1	...	...	...	...	...	...	...	...	...
Lupus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tubercle of other organs	55	11	9	4	4	4	2	6	10	3	1	1	...	...
General Tuberculosis	99	27	32	7	3	7	4	7	7	3	2	...	...	...
Scrofula	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Parasitic Diseases	1	...	...	...	...	...	1	...	...	...	...	...	...	...
Starvation	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Scurvy	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Alcoholism, Delirium Tremens	77	...	...	...	...	...	...	8	25	23	15	5	1	...
Opium, Morphia Habit	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ptomaine Poisoning	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Industrial Poisoning: Lead	1	...	...	...	...	...	...	...	1	...	...	...	...	...
Industrial Poisoning: Phosphorus	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Industrial Poisoning: Arsenic, &c.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rheum: Fever, Acute Rheum:	38	...	4	4	9	7	3	3	4	2	2	...	...	...
Rheumatism of Heart	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Chronic Rheumatism	34	...	...	...	...	...	...	1	2	3	11	8	9	...
Rheum: Arthritis, Rheum: Gout	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Gout	2	...	...	...	...	...	...	...	...	1	1	...	...	...
Carcinoma	343	...	...	...	...	...	1	13	51	83	116	61	16	2
Sarcoma	52	1	3	2	...	1	1	2	9	16	10	6	...	1
"*Cancer*," Malignant Disease	57	...	...	...	...	...	...	1	9	16	16	14	1	...
Rickets	59	14	43	2	...	...	...	...	...	...	...	...	...	...
Purpura	6	...	2	1	...	...	...	...	...	...	...	2	1	...
Hæmophilia, Hæm: Diathesis	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Anæmia, Leucocythæmia	32	3	1	1	2	4	2	3	3	7	6	...	...	...
Diabetes Mellitus	56	...	1	...	...	1	1	10	8	9	13	9	4	...
Premature Birth	373	373	...	...	...	...	...	...	...	...	...	...	...	...
Congenital Defects	80	75	3	...	2	...	...	...	...	...	...	...	...	...
Injury at Birth	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Atelectasis	25	25	...	...	...	...	...	...	...	...	...	...	...	...
Want of Breast Milk	5	5	...	...	...	...	...	...	...	...	...	...	...	...
Teething	51	30	21	...	...	...	...	...	...	...	...	...	...	...
B.—Local Diseases.														
1.—NERVOUS SYSTEM.														
Inflammation of Brain	134	50	48	10	9	4	2	1	6	3	1	...	...	...
Softening of Brain	25	...	...	...	...	...	...	...	1	6	6	8	4	...
General Paraly: of Insane	63	...	...	...	...	...	...	11	24	18	8	2	...	...
Insanity (not puerperal)	89	...	...	...	...	1	4	10	12	13	20	17	10	2
Chorea	3	...	1	...	1	1	...	...	...	...	...	...	...	...
Epilepsy	40	...	2	1	...	3	3	7	10	2	4	8	...	...
Convulsions	190	153	35	2	...	...	...	...	...	...	...	...	...	...
Laryngismus Stridulus	17	5	11	1	...	...	...	...	...	...	...	...	...	...
Locomotor Ataxy	8	...	...	...	...	...	...	...	3	1	1	3	...	...
Dis: of Spinal Cord	31	1	2	...	...	1	1	2	4	7	7	4	2	...
Neuritis	18	...	...	...	...	...	...	2	5	5	4	2	...	...
Brain Tumour	11	...	...	2	1	...	1	1	4	2	...	...	...	...
Nervous System (other Dis:)	26	4	...	1	...	...	...	2	3	4	5	5	2	...
2. DISEASES OF SPECIAL SENSE ORGANS.														
Otitis, Mastoid Disease	27	2	9	4	3	4	1	2	1	...	1	...	...	...
Epistaxis, Nose Disease	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ophthalmia, Eye Disease	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE A, 1904—*continued.*

CAUSES OF DEATH	All Ages	Under 5 Years: 0 to 1	Under 5 Years: 1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
3. Diseases of Heart.														
Valvular Dis : Endocarditis	240	...	...	3	15	9	12	23	36	41	52	41	7	1
Pericarditis	8	...	1	2	...	...	1	...	...	3	1	...	...	...
Hypertrophy of Heart	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Angina Pectoris	9	...	...	...	...	...	...	...	1	1	3	3	1	...
Dilatation of Heart	103	...	1	1	...	...	2	3	10	16	39	23	8	...
Fatty Degen : of Heart	17	...	...	...	...	...	...	...	3	4	7	3	...	...
Syncope, Heart Disease	661	21	8	6	7	7	7	26	57	95	143	173	90	21
4. Dis : of Blood Vessels.														
Cerebral Hæmorrhage	321	1	1	1	...	3	1	8	20	57	94	91	41	3
Apoplexy, *Hemiplegia*	87	...	...	...	...	...	1	1	5	12	33	23	12	...
Aneurism	23	...	...	...	...	...	...	2	9	3	7	2	...	...
Senile Gangrene	18	...	...	...	...	...	...	...	...	...	3	11	4	...
Embolism, Thrombosis	10	1	...	...	...	...	1	2	2	...	2	2	...	...
Phlebitis	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Varicose Veins	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Blood Vessels (Other Diseases)	15	...	...	1	...	...	...	...	2	...	4	5	2	1
5. Dis : of Respiratory Sys :														
Laryngitis	15	2	9	...	...	...	...	...	2	...	2	...	...	...
Memb: Laryng: (Not Diphth:)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Croup	5	...	5	...	...	...	...	...	...	...	...	...	...	...
Larynx (Other Dis:)	3	...	1	...	...	...	...	1	...	1	...	...	...	...
Bronchitis	1,216	307	128	5	...	2	6	13	48	117	255	232	89	14
Pneumonia { Lobar	751	251	249	14	4	10	13	47	44	45	35	33	4	2
Pneumonia { Broncho	201	29	34	21	2	4	7	9	21	12	26	26	9	1
"*Pneumonia*"	149	29	27	4	3	3	4	17	14	15	18	10	5	...
Emphysema, Asthma	32	...	...	...	...	...	...	1	3	4	13	8	3	...
Pleurisy	26	1	4	1	...	1	1	3	2	1	11	...	1	...
Fibroid Disease of Lung	7	...	...	...	...	...	...	...	1	2	4	...	...	...
Respiratory Dis: (Other)	39	6	7	...	...	...	1	...	4	1	5	3	6	6
6. Dis: of Digestive Sys:														
Tonsillitis, Quinsy	2	1	...	...	...	...	...	1	...	...	...	...	...	...
Mouth, Pharynx	22	13	6	...	...	...	...	...	...	...	1	2	...	...
Gastric Ulcer	26	...	...	1	...	3	2	7	6	5	1	1	...	...
Gastric Catarrh	26	24	1	...	1	...	...	...	...	...	...	...	...	...
Stomach (Other Dis:)	62	33	7	2	1	...	1	1	1	1	7	7	1	...
Enteritis	56	36	8	4	...	1	...	...	3	2	1	1	...	...
Gastro-Enteritis	86	59	22	...	1	...	...	...	...	...	2	2	...	...
Appendicitis, Perityph :	21	...	...	1	4	3	4	1	4	1	2	1	...	...
Hernia	20	1	...	...	...	...	...	...	3	3	5	4	4	...
Intestinal Obstruct:	35	2	...	1	1	3	2	3	4	5	7	4	3	...
Other Diseases of Intestines	25	13	1	1	...	2	...	...	3	2	2	1	...	...
Peritonitis	32	4	3	5	1	2	7	5	1	3	...	1	...	...
Cirrhosis of Liver	75	...	...	...	...	...	1	4	13	30	20	7	...	...
Liver and Gall Bladder (O. D.)	55	19	1	2	...	1	...	5	4	7	8	6	2	...
Digestive System (Other Dis:)	24	11	3	...	...	...	...	1	1	4	2	1	1	...
7. Dis : of Lymphatic and Ductless Glands.														
Spleen, Disease of	7	...	1	1	1	...	1	1	...	1	1	...	...	...
Lymphat: Syst: (Other Dis:)	6	2	1	1	...	...	...	1	...	...	1	...	...	...
Thyroid Body (Other Dis:)	3	...	...	...	...	1	...	...	1	...	1	...	...	...
Supra Renal Caps: (Dis: of)	2	...	...	...	...	...	...	...	...	...	1	1	...	...
8. Diseases of Urinary System.														
Nephritis Ac:, Uræmia	81	6	9	3	...	1	7	13	9	10	14	9	...	...
Ch : Bright's Dis : Albumin :	161	...	4	1	...	1	5	16	24	35	48	22	5	...
Calculus	2	...	...	...	...	...	...	1	...	1	...	...	...	...
Bladder and Prostate Dis :	27	...	...	...	...	...	...	...	...	2	8	12	5	...
Urinary Syst : (Other Dis :)	9	...	...	...	...	...	...	1	3	2	2	1	...	...

TABLE A, 1904—*concluded.*

CAUSES OF DEATH	All Ages	Under 5 Years: 0 to 1	Under 5 Years: 1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
9. DISEASES OF GENERATIVE SYSTEM.														
Ovarian Tumour	1	...	...	...	...	...	...	...	...	1	...	...	...	...
Other Dis : of Ovary	6	...	...	...	...	...	...	3	...	2	1	...	...	...
Uterine Tumour	1	...	...	...	...	...	...	1	...	...	...	...	...	...
Other Dis: of Uterus and Vagina	3	...	...	...	...	...	...	...	2	1	...	...	...	...
Disord : of Menstruation	2	...	...	...	...	...	1	1	...	...	...	...	...	...
Gener: and Mam: Orgs: (other)	2	...	...	...	...	...	...	1	1	...	...	...	...	...
10. DISEASES OF PREGNANCY AND CHILDBIRTH.														
Abortion, Miscarriage	4	...	...	...	...	...	...	2	2	...	...	...	...	...
Puerperal Mania	2	...	...	...	...	...	...	...	2	...	...	...	...	...
Puerperal Convulsions	5	...	...	...	...	1	1	1	2	...	...	...	...	...
Placenta Præv: Flooding	10	...	...	...	...	...	2	5	3	...	...	...	...	...
Other Ac: of Preg: & Childbirth	16	...	...	...	...	...	1	8	7	...	...	...	...	...
11. DISEASES OF LOCOMOTOR SYSTEM.														
Caries, Necrosis	10	...	1	2	1	1	3	2	...	...	...	...	...	...
Arthritis, Periostitis	2	...	...	...	1	1	...	...	...	...	...	...	...	...
Locomotor Sys : (Other)	5	2	1	1	...	...	1	...	...	...	...	...	...	...
12. DISEASES OF THE SKIN.														
Ulcer, Bedsore	6	...	...	...	...	...	...	...	...	...	4	1	1	...
Eczema	2	2	...	...	...	...	...	...	...	...	...	...	...	...
Pemphigus	5	4	1	...	...	...	...	...	...	...	...	...	...	...
Skin Diseases (other)	10	3	2	...	1	...	...	...	...	...	3	...	1	...
C.—Other Specified Diseases	10	3	...	...	...	...	...	2	2	1	2	...	...	...
D.—Ill-defined and not Specified Diseases.														
Atrophy, Debility	620	527	35	1	...	...	...	...	1	1	9	21	23	2
Old Age	275	...	...	...	...	...	...	...	...	...	15	98	130	32
Dropsy, Ascites, Anasarca	1	..	...	...	...	...	...	...	...	...	...	1	...	...
Tumour	1	...	...	...	...	...	...	...	...	...	1	...	...	...
Abscess	5	2	...	...	1	...	...	1	1	...	...	...	...	...
Hæmorrhage	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Sudden (cause unascertained)	3	2	1	...	...	...	...	...	...	...	...	...	...	...
Other Ill-defined	3	1	...	...	...	...	...	...	...	...	...	2	...	...
E.—Violent Deaths.														
1. ACCIDENT.														
In Mines and Quarries	...	...	...	...	...	...	...	...	...	...	...	...	...	...
By Vehicles: On Railways	7	...	...	...	...	1	2	2	...	1	1	...	...	...
By Vehicles: In Streets	28	...	8	1	2	...	...	3	4	2	6	...	2	...
Ships, Boats, Docks (not Drowning)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Building Operations	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Machinery	7	...	...	1	1	3	...	...	2	...	...	...	...	...
Weapons and Implements	1	...	...	...	...	...	1	...	...	...	...	...	...	...
Burns and Scalds	65	2	33	11	4	2	2	1	2	5	1	2	...	...
Poison, Poisonous Vapours	11	...	1	1	1	1	...	...	1	5	...	1	...	...
Drowning	33	1	5	2	...	1	1	3	8	8	2	1	1	...
Suffocation	79	74	1	...	...	...	1	...	1	1	...	...	...	...
Falls	86	1	8	2	2	1	4	5	11	12	18	14	6	2
Weather Agencies	2	...	...	1	...	...	...	...	...	...	...	1	...	...
Otherwise or not Stated	28	1	2	2	...	3	2	3	3	7	4	1	...	...
2. HOMICIDE.	5	...	1	...	...	...	...	2	...	1	1	...	...	...
3. SUICIDE.	55	...	...	..	...	2	2	10	14	11	10	5	1	...
4. EXECUTION.	...	...	...	...	...	...	...	...	...	...	...	...	...	...

TABLE B.—MANCHESTER, 1904.

Causes of Deaths at Different Life Periods—MALES.

Classes	CAUSES OF DEATH	All Ages Total	Ages at Death—in years: Under 5 Years: 0 to 1	1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
	All Causes	6102	1783	886	136	78	109	145	365	517	596	706	535	213	33
	Smallpox	4	...	...	...	...	1	1	2	...	...	...	...	...	...
	Measles	221	44	172	4	1	...	...	...	...	...	...	...	...	...
	Scarlet Fever	49	7	24	12	4	..	...	1	1	...	...	...	...	...
	Typhus Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Whooping Cough	123	55	65	3	...	...	...	...	...	...	...	...	...	...
	Diphtheria, Memb: Croup	46	6	26	10	3	1	...	...	...	...	...	...	...	...
	Ill-defined Fever	1	...	...	...	...	...	...	...	...	...	...	...	1	...
	Enteric Fever	38	...	1	3	1	4	6	9	9	3	2	...	...	...
	Influenza	44	3	5	...	1	1	1	7	5	7	9	4	1	...
	Epidemic Diarrhœa	329	248	75	1	...	...	...	...	2	1	1	1	...	...
	Diarrhœa, Dysen., Simple Chol.	86	70	12	...	...	...	...	...	...	1	...	1	2	...
	Venereal Affections	33	19	1	...	...	...	...	2	1	3	5	2	...	...
	Erysipelas	13	4	...	...	...	...	...	1	1	1	4	2	...	...
	Pyæmia, Septicæmia	17	4	5	1	2	...	1	1	1	1	1	...	...	...
	Puerperal Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
A	Other Zymotics	3	...	...	1	...	...	...	...	1	...	1	...	...	...
	Tuberc. Periton: Tabes Mes:	43	22	10	5	4	...	...	1	...	...	1	...	...	...
	Tubercular Meningitis	71	15	39	10	4	1	1	...	...	1	...	...	...	...
	Phthisis	691	5	12	10	12	37	54	143	171	144	80	21	2	...
	Tuberculous Dis. (other)	85	18	24	5	2	6	2	9	11	4	3	1	...	...
	Parasitic Diseases	...	...	...	...	..	...	...	...	...	...	...	...	..	...
	Alcoholism	51	...	...	...	...	...	...	6	12	16	11	5	1	...
	Rheumatic Fever	21	...	2	3	8	3	2	1	2	...	...	...	...	...
	Cancer	192	...	2	1	...	1	1	4	22	51	67	37	5	1
	Premature Birth	218	218	...	...	...	...	...	...	...	...	...	...	...	...
	Congenital Defects	56	54	1	...	1	...	...	...	...	...	...	...	...	...
	Epilepsy	25	...	2	...	...	3	2	5	5	2	2	4	...	...
	Convulsions	103	86	16	1	...	...	...	...	...	...	...	...	...	...
	Nervous Syst: (other)	237	34	34	10	6	4	4	14	35	28	34	25	7	2
	Cereb: Haem: Apoplexy, Hemip:	179	1	1	1	...	2	2	5	9	33	60	48	17	...
	Heart and Blood Vessel Dis:	548	15	3	6	8	9	19	27	61	87	126	128	51	8
	Croup	2	...	2	...	...	...	...	...	...	...	...	...	...	...
	Bronchitis	572	163	65	1	...	...	5	6	26	57	112	103	30	4
B and C	Pneumonia	611	172	157	20	6	11	12	51	52	54	42	26	7	1
	Respiratory Dis: (other)	69	6	7	...	...	1	1	7	6	6	20	10	5	...
	Digestive Syst: (other)	275	124	21	7	5	6	9	8	19	25	25	19	7	...
	Urinary Syst: (other)	160	4	5	3	...	1	5	21	19	31	38	25	8	...
	Generative Organs	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Other specified Diseases	163	35	44	7	4	7	6	12	12	5	21	7	3	...
	Marasmus and Atrophy	346	306	16	...	...	...	...	...	...	...	3	10	10	1
D	Old Age	116	...	...	...	...	...	...	...	...	...	9	42	49	16
	Other Ill-defined Causes	8	4	...	...	1	...	...	...	...	...	1	2	...	...
	Violence	212	41	36	11	5	9	9	14	26	26	21	8	6	...
E	Homicide	3	...	1	...	...	...	...	1	...	...	1	...	...	...
	Suicide	38	...	...	...	...	1	2	7	8	9	6	4	1	...

TABLE C.—MANCHESTER, 1904.

Causes of Deaths at Different Life Periods—FEMALES.

Classes	CAUSES OF DEATH	All Ages Total	Under 5 Years 0 to 1	Under 5 Years 1 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75	75 to 85	85 and upwards
	All Causes	5564	1457	855	145	66	94	129	284	422	478	665	600	317	52
	Smallpox	5	1	...	...	...	...	2	1	...	1	...	...	...	...
	Measles	204	38	156	10	...	...	...	...	...	...	...	...	...	...
	Scarlet Fever	36	2	25	5	3	...	...	...	...	1	...	...	...	...
	Typhus Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Whooping Cough	157	66	83	8	...	...	...	...	...	...	...	...	...	...
	Diphtheria, Memb: Croup	53	4	30	17	2	...	...	...	...	...	...	...	...	...
	Ill-defined Fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Enteric Fever	28	...	2	...	1	5	5	3	8	3	1	...	...	...
	Influenza	53	2	3	3	...	1	1	1	9	2	13	13	5	...
	Epidemic Diarrhœa	278	224	51	...	...	1	...	...	...	...	...	1	...	1
	Diarrhœa, Dysentery, Simple Cholera	68	49	16	2	...	...	...	...	...	...	...	1	...	...
	Venereal Affections	25	21	2	...	...	...	...	1	...	1	...	...	...	...
	Erysipelas	14	7	1	...	...	...	...	1	...	2	1	1	1	...
	Pyæmia, Septicæmia	13	4	...	1	...	...	3	1	1	2	1	...	...	...
	Puerperal Fever	18	...	...	...	...	...	3	11	4	...	...	...	...	...
A	Other Zymotics	2	1	...	1	...	...	...	...	...	...	...	...	...	...
	Tubercular Periton: Tabes Mes.	41	18	14	4	3	2	...	...	...	...	...	...	...	...
	Tubercular Meningitis	76	22	35	11	3	...	3	1	1	...	...	...	...	...
	Phthisis	415	2	7	10	11	37	55	93	91	66	34	9	...	...
	Tuberculous Diseases (other)	69	20	17	6	5	5	4	4	6	2	...	...	...	...
	Parasitic Diseases	1	...	...	...	...	...	1	...	...	...	...	...	...	...
	Alcoholism	26	...	...	...	...	...	...	2	13	7	4	...	...	...
	Rheumatic Fever	17	...	2	1	1	4	1	2	2	2	2	...	...	...
	Cancer	260	1	1	1	...	...	1	12	47	64	75	44	12	2
	Premature Birth	155	155	...	...	...	...	...	...	...	...	...	...	...	...
	Congenital defects	49	46	2	...	1	...	...	...	...	...	...	...	...	...
	Epilepsy	15	...	...	1	...	...	1	2	5	...	2	4	...	...
	Convulsions	87	67	19	1	...	...	...	...	...	...	...	...	...	...
	Nervous System (other)	188	26	28	4	5	3	4	15	27	31	18	16	11	...
	Cerebral Hemorrhage, Apoplexy, and Hemiplegia	229	...	...	...	...	1	...	4	16	36	67	66	36	3
	Heart and Blood Vessel Diseases	556	7	7	7	14	7	4	29	59	76	135	135	61	15
	Croup	3	...	3	...	...	...	...	...	...	...	...	...	...	...
B and C	Bronchitis	644	144	63	4	...	2	1	7	22	60	143	129	59	10
	Pneumonia	490	137	153	19	3	6	12	22	27	18	37	43	11	2
	Respiratory Diseases (other)	53	3	14	1	...	...	1	2	3	7	13	4	5	...
	Digestive System (other)	292	92	31	10	4	9	8	20	24	38	33	19	4	...
	Urinary System (other)	120	2	8	1	...	1	7	10	17	19	34	19	2	...
	Generative Organs and Childbirth	52	...	...	...	...	1	5	22	19	4	1	...	...	...
	Other specified Diseases	179	35	40	6	5	5	3	10	7	17	24	14	13	...
	Marasmus and Atrophy	274	221	19	1	...	...	...	...	1	1	6	11	13	1
D	Old Age	159	...	...	...	...	...	...	...	...	...	6	56	81	16
	Other Ill-defined Causes	6	2	1	...	...	...	...	1	1	...	...	1	...	...
	Violence	135	38	22	10	5	3	4	3	6	15	11	13	3	2
E	Homicide	2	...	...	...	...	...	...	1	...	1	...	...	...	...
	Suicide	17	...	...	...	...	1	...	3	6	2	4	1	...	...

TABLE D.

City of Manchester, 1904.—Causes of Death in Infancy and Childhood.

Causes of Death	Under One Year: Under 3 months	3–6 months	6–12 months	Total under One Year	One and under Five Years: 1–	2–	3–	4–	Total under Five Years
All Causes	**1,464**	**729**	**1,047**	**3,240**	**1,018**	**402**	**187**	**134**	**4,981**
Measles	1	4	77	82	200	76	39	13	410
Scarlatina	1	3	5	9	8	16	13	12	58
Whooping Cough	16	25	80	121	84	39	15	10	269
Diphtheria (Memb: Croup)	1	2	7	10	16	15	11	14	66
Fever (various forms)	...	...	...	...	1	1	...	1	3
Diarrhœal Diseases	154	211	226	591	127	21	3	3	745
Syphilis	26	13	1	40	1	...	1	1	43
Tabes Mesenterica and Tuberc. Peritonitis	11	14	15	40	15	5	1	3	64
Hydrocephalus	2	15	20	37	36	16	13	9	111
Scrofula (other)	8	14	23	45	35	9	9	7	105
Premature Birth	366	6	1	373	...	...	...	...	373
Teething	...	5	25	30	19	2	...	...	51
Convulsions	88	33	32	153	24	6	4	1	188
Brain Diseases (other)	13	17	30	60	33	17	8	4	122
Lung Diseases	149	150	326	625	286	105	44	29	1,089
Atrophy, Marasmus	315	121	91	527	28	7	...	...	562
Found Dead in Bed	49	12	5	66	...	...	...	...	*66
Suffocation	6	1	1	8	1	...	...	...	9
Violence (other forms)	1	2	2	5	13	23	12	10	63
Ill-defined Causes	4	1	1	6	...	1	...	...	7
Unclassified	253	80	79	412	91	43	14	17	576

* 65 of these were "Found dead in bed, suffocated."

TABLE E, 1881 TO 1904.—MANCHESTER.—ESTIMATED POPULATIONS. ANNUAL RATES OF MARRIAGES, BIRTHS, AND DEATHS (*a*) from all causes, and (*b*) from specified causes; also the percentages to total deaths of Inquest Cases, and of Deaths in Public Institutions; also the quinquennial averages from 1871–1900, with the average for same period.

	Years	Estimated Populations (Mean)	Persons Married	Annual Rates per 1,000 Persons living: Births	Deaths (All Causes)	Smallpox	Measles	Scarlet Fever	Diphtheria	Whooping Cough	Typhus Fever	Enteric Fever	Simple Continued Fever	Diarrhœa and Dysentery	English Cholera	Violence	Percentages to Total Deaths: Inquest Cases	Deaths in Public Institutions	Years	
Quinquennial Averages	1871–1875	477,344	24·6	38·9	28·3	0·26	0·64	1·08	0·08	0·78	0·14	0·43	0·21	1·92	0·03	0·94	7·2	13·4	1871–1875	Quinquennial Averages
	1876–1880	509,802	18·6	38·7	26·2	0·24	0·53	1·07	0·13	0·84	0·08	0·29	0·11	1·22	0·04	0·89	7·5	14·3	1876–1880	
	1881–1885	542,746	17·9	35·1	23·6	0·04	0·71	0·48	0·10	0·68	0·05	0·20	0·03	0·96	0·03	0·72	7·0	15·9	1881–1885	
	1886–1890	575,630	16·6	33·4	24·6	0·02	0·83	0·50	0·32	0·54	0·02	0·30	0·01	1·06	0·02	0·78	6·9	17·7	1886–1890	
	1891–1895	517,801	16·9	33·2	23·6	0·03	0·62	0·26	0·27	0·64	0·00	0·24	0·01	1·14	0·05	0·77	7·1	19·2	1891–1895	
	1896–1900	539,599	18·2	32·5	22·7	...	0·89	0·20	0·13	0·53	0·00	0·18	0·01	1·65	0·04	0·73	7·1	20·2	1896–1900	
Avge. 30 yrs.	1871–1900	527,154	18·8	35·3	24·8	0·10	0·70	0·60	0·17	0·67	0·05	0·27	0·06	1·32	0·03	0·80	7·1	16·8	1871–1900	Avge. 30 yrs.
	1881	530,051	17·8	35·9	22·8	0·03	0·29	0·34	0·09	0·71	0·03	0·17	0·06	0·73	0·02	0·84	8·1	15·9	1881	
	1882	536,324	18·8	35·7	24·0	0·05	0·89	0·34	0·11	0·87	0·10	0·25	0·04	1·00	0·03	0·67	7·2	14·5	1882	

TABLE E—*Continued.*

Years	Estimated Populations (Mean)	Persons Married	Annual Rates per 1,000 Persons living: Births	Deaths (All Causes)	Smallpox	Measles	Scarlet Fever	Diphtheria	Whooping Cough	Typhus Fever	Enteric Fever	Simple Continued Fever	Diarrhœa and Dysentery	English Cholera	Violence	Percentages to Total Deaths: Inquest Cases	Deaths in Public Institutions	Years
1883	542,671	17·8	34·9	24·4	0·01	0·71	0·81	0·11	0·62	0·05	0·20	0·03	0·95	0·03	0·73	7·0	15·5	1883
1884*	549,093	18·0	34·4	23·4	0·01	0·57	0·74	0·08	0·49	0·03	0·19	0·03	1·46	0·05	0·65	6·2	17·3	1884*
1885	555,591	17·0	34·8	23·6	0·08	1·08	0·17	0·10	0·71	0·04	0·17	0·01	0·64	0·02	0·69	6·4	16·4	1885
1886	562,166	16·4	34·7	24·1	0·00	0·27	0·41	0·15	0·57	0·03	0·29	0·01	1·34	0·04	0·71	7·2	17·0	1886
1887	568,819	16·6	33·9	25·4	0·01	1·54	0·63	0·23	0·50	0·02	0·31	0·01	1·19	0·02	0·77	6·9	16·1	1887
1888	575,550	16·0	33·3	23·3	0·07	0·27	0·42	0·36	0·79	0·02	0·33	0·02	0·71	0·01	0·74	6·7	18·3	1888
1889	582,362	17·0	33·1	24·2	0·00	1·22	0·45	0·51	0·45	0·01	0·31	0·01	1·00	0·03	0·89	6·5	18·2	1889
1890*	589,253	17·0	31·8	26·2	...	0·83	0·60	0·36	0·37	0·01	0·27	0·02	1·04	0·02	0·79	7·0	19·1	1890*
1891†	‡ 508,673	17·2	33·8	26·0	...	0·43	0·22	0·25	1·02	0·01	0·37	0·01	0·81	0·04	0·79	6·8	18·4	1891†
1892†	‡ 513,196	17·2	33·4	23·2	0·00	0·72	0·27	0·25	0·72	0·00	0·24	0·01	0·79	0·02	0·77	7·4	18·2	1892†
1893†	‡ 517,760	16·0	33·4	24·3	0·09	0·57	0·27	0·35	0·46	0·00	0·25	0·01	1·75	0·10	0·76	6·9	18·7	1893†
1894†	‡ 522,365	16·8	31·8	19·8	0·04	0·42	0·22	0·29	0·55	...	0·17	0·01	0·70	0·02	0·75	7·5	21·3	1894†
1895†	‡ 527,010	17·4	33·4	24·5	0·00	0·96	0·33	0·21	0·47	...	0·18	0·01	1·66	0·06	0·80	6·9	19·2	1895†
1896†*	‡ 531,697	18·3	32·8	22·0	...	1·05	0·37	0·15	0·66	0·00	0·22	0·01	1·04	0·02	0·71	7·4	19·7	1896†*
1897†	‡ 536,426	17·8	32·9	22·4	...	1·17	0·23	0·08	0·56	0·00	0·18	0·00	1·74	0·06	0·68	6·6	20·0	1897†
1898†	‡ 541,296	18·3	32·3	21·2	...	0·50	0·12	0·09	0·31	...	0·22	0·01	1·96	0·06	0·69	7·0	19·5	1898†
1899†	‡ 546,010	18·4	32·2	23·9	...	1·28	0·08	0·16	0·42	0·00	0·13	0·01	2·02	0·03	0·78	7·0	19·7	1899†
1900†	‡ 542,566	18·0	32·4	23·8	...	0·47	0·19	0·19	0·68	...	0·14	0·01	1·49	0·03	0·78	7·4	21·9	1900†
1901†	‡ 546,408	17·6	28·7	21·6	...	0·53	0·23	0·24	0·41	0·02	0·14	0·00	1·86		0·78	7·9	23·2	1901†
1902†*	‡ 550,355	18·1	33·0	20·0	...	0·44	0·27	0·22	0·44	...	0·12	...	0·54		0·73	7·6	23·8	1902†*
1903†	‡ 554,331	17·8	31·7	19·5	0·04	0·62	0·17	0·25	0·38	...	0·17	0·00	0·91		0·72	7·0	25·3	1903†
1904†	‡ 558,335	16·5	31·1	20·9	0·02	0·76	0·15	0·18	0·50	...	0·12	0·00	1·36		0·73	5·9	24·6	1904†

* The facts for these years are for 53 instead of 52 weeks; corrections have, therefore, been made in calculating the rates.

† The populations and rates for the years subsequent to 1890, except the marriage rates, relate to the City of Manchester as enlarged by the Act of that year. The facts and rates for previous years are those for the three Unions of Manchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."

TABLE F, 1881 TO 1904.—MANCHESTER.

ANNUAL RATES OF MORTALITY FROM CERTAIN CAUSES OF DEATH.

YEAR	ANNUAL RATES PER 1,000 PERSONS LIVING										RATES PER 1,000 BIRTHS	
	Cancer	Tabes Mesenterica	Phthisis	Other Tuber: Diseases	Diseases of Nervous System	Diseases of Circulatory System	Diseases of Respiratory System	Diseases of Digestive System	Diseases of Urinary System	Diseases of Generative System	Puerperal Fever	Childbirth
881–1885	0·50	0·35	2·42	0·57	3·28	1·37	5·41	1·23	0·48	0·08	3·03	1·99
886–1890	0·64	0·36	2·24	0·59	3·09	1·73	5·76	1·23	0·61	0·08	3·22	2·13
891–1895	0·62	0·22	2·09	0·75	1·74	2·53	5·56	1·07	0·52	0·07	2·75	3·42
896–1900	0·73	0·19	2·04	0·63	1·32	2·54	5·03	1·04	0·49	0·09	1·55	1·51
881–1900	0·62	0·28	2·20	0·64	2·36	2·04	5·44	1·14	0·43	0·08	2·64	2·26
1881	0·48	0·28	2·46	0·52	3·33	1·19	5·57	1·24	0·39	0·07	3·15	1·37
1882	0·44	0·40	2·41	0·61	3·35	1·34	5·33	1·19	0·45	0·08	3·92	1·62
1883	0·54	0·34	2·54	0·59	3·32	1·33	5·66	1·20	0·50	0·06	2·27	1·58
1884*	0·51	0·39	2·34	0·56	3·27	1·44	4·88	1·23	0·59	0·10	2·81	2·55
1885	0·51	0·36	2·34	0·56	3·12	1·53	5·59	1·28	0·49	0·08	3·05	2·84
1886	0·56	0·43	2·44	0·59	3·30	1·53	5·43	1·26	0·57	0·08	2·67	1·85
1887	0·62	0·39	2·19	0·53	3·17	1·66	5·72	1·23	0·53	0·08	3·58	1·35
1888	0·65	0·31	2·14	0·62	3·19	1·72	5·31	1·16	0·62	0·10	4·12	1·77
1889	0·70	0·36	2·12	0·59	2·94	1·79	5·06	1·28	0·64	0·08	3·06	1·87
1890*	0·65	0·33	2·33	0·62	2·87	1·93	7·28	1·22	0·66	0·08	2·68	3·89
1891†	0·63	0·25	2·20	0·78	2·30	2·69	6·77	1·03	0·55	0·07	3·08	4·01
1892†	0·61	0·21	2·05	0·75	1·70	2·59	5·44	1·14	0·53	0·05	3·79	4·54
1893†	0·59	0·26	2·05	0·76	1·70	2·48	5·53	1·20	0·53	0·07	3·70	3·94
1894†	0·66	0·18	1·97	0·67	1·48	2·31	4·35	0·96	0·49	0·04	1·93	2·77
1895†	0·63	0·22	2·16	0·77	1·51	2·60	5·73	1·04	0·49	0·11	1·25	1·82
1896†	0·66	0·13	2·00	0·60	1·33	2·53	5·19	1·04	0·46	0·11	0·96	1·47
1897†	0·74	0·22	2·12	0·67	1·35	2·45	4·51	1·03	0·51	0·10	2·10	1·36
1898†	0·73	0·19	1·95	0·67	1·22	2·15	4·27	1·00	0·54	0·09	1·72	1·54
1899†	0·75	0·24	2·05	0·61	1·34	2·73	5·47	0·99	0·47	0·10	1·37	1·54
1900†	0·76	0·17	2·09	0·60	1·37	2·82	5·78	1·15	0·48	0·05	1·59	1·65
1901†	0·78	0·20	2·09	0·83	1·22	2·55	4·48	1·00	0·49	0·03	2·17	1·72
1902†	0·79	0·16	2·08	0·55	1·13	2·61	4·71	0·93	0·58	0·11	0·94	1·65
1903†	0·76	0·18	1·85	0·58	1·25	2·46	3·95	0·99	0·46	0·08	0·80	1·59
1904	0·81	0·15	1·98	0·54	0·76‡	2·71	4·38	1·02	0·50	0·09	1·04	2·13

* The facts for these years are for 53 instead of 52 weeks; corrections have therefore been made alculating the rates.

† The rates of mortality for the years subsequent to 1890 refer to the City of Manchester as rged by the Act of that year. The rates for 1890 and for previous years are those for the three Unions lanchester, Chorlton, and Prestwich, which have been taken to approximately represent "Manchester."

‡ 1·17, including Convulsions.

TABLE G, 1904.—Population, Area, Density. Total Births and Deaths, with Birth and Death Rates.

[Institution Populations, Births and Deaths, distributed.]

Statistical Divisions	Estimated Population	Area in Acres	Persons to an Acre	Births		Deaths		Natur Rate o Increa
				Total	Rate per 1,000	Total	Rate per 1,000	
City of Manchester	**558,335**	**12,910**	**43**	**17,353**	**31·08**	**11,666**	**20·89**	**10·2**
I. Manchester Township	130,742	1,646	79	4,277	32·71	3,497	26·75	6·0
II. North Manchester	177,056	7,321	24	5,417	30·59	3,032	17·12	13·5
III. South Manchester	250,537	3,943	64	7,659	30·57	5,137	20·51	10·1
I. Ancoats	44,141	400	110	1,497	33·91	1,138	25·78	8·2
I. Central	27,787	748	37	785	28·25	819	29·47	1·2
I. St. George's	58,814	498	118	1,995	33·92	1,540	26·18	7·7
II. Cheetham	39,531	919	43	1,210	30·61	524	13·26	17·4
II. Crumpsall	9,139	733	12	197	21·56	135	14·77	6·8
II. Blackley	9,311	1,840	5	255	27·39	153	16·43	10·8
II. Harpurhey	18,825	193	98	533	28·31	319	16·95	11·4
II. Moston	15,389	1,297	12	392	25·47	225	14·62	10·9
II. Newton Heath	37,552	1,350	28	1,114	29·67	715	19·04	10.6
II. Bradford	24,553	288	89	933	38·00	529	21·55	16·5
II. Beswick	12,123	96	126	444	36·62	279	23·01	13·6
II. Clayton	10,633	605	18	339	31·88	153	14·39	17·5
III. Ardwick	43,192	509	86	1,352	31·30	866	20·05	11·3
III. Openshaw	28,146	581	48	930	33·04	589	20·93	12·1
III. West Gorton	30,738	318	97	912	29·67	535	17·41	12·3
III. Rusholme and Kirk. ...	25,886	1,412	18	788	30·44	413	15·95	14·5
III. Chorlton-upon-Medlock	57,093	646	88	1,430	25·05	1,144	20·04	5·0
III. Hulme	65,482	477	137	2,247	34·31	1,590	24·28	10·0

Note.—Calculated on the Census of 1891 and 1901.

TABLE H, 1904.

BIRTHS REGISTERED IN THE CITY OF MANCHESTER, IN ITS MAIN DIVISIONS AND IN DISTRICTS; DISTINGUISHING LEGITIMATE AND ILLEGITIMATE BIRTHS; ALSO THE PROPORTION OF MORTALITY AMONG INFANTS OF BOTH CLASSES UNDER ONE YEAR OF AGE.

STATISTICAL DIVISIONS	BIRTHS		Percentage of Illegitimate Births to Total Births	DEATHS UNDER 1 YEAR		PROPORTION OF DEATHS UNDER 1 YEAR PER 1,000 BIRTHS		
	Total	Illegitimate		Total	Of Illegitimate Children	Total	Legitimate	Illegitimate
City of Manchester......	**17,353**	**707**	**4·1**	**3,240**	**277**	**187**	**178**	**392**
I. Manchester Township	4,277	211	4·9	890	94	208	196	445
II. North Manchester......	5,417	142	2·6	897	58	166	159	408
III. South Manchester	7,659	354	4·6	1,453	125	190	182	353
I. Ancoats	1,497	75	5·0	321	32	214	203	427
I. Central	785	54	6·9	172	30	219	194	556
I. St. George's	1,995	82	4·1	397	32	199	191	390
II. Cheetham	1,210	35	2·9	116	9	96	91	257
II. Crumpsall	197	11	5·6	22	2	112	108	182
II. Blackley...............	255	3	1·2	35	2	137	131	666
II. Harpurhey............	533	14	2·6	90	3	169	168	214
II. Moston	392	5	1·3	65	1	166	165	200
II. Newton Heath	1,114	33	3·0	208	19	187	175	576
II. Bradford	933	29	3·1	208	16	223	212	552
II. Beswick	444	8	1·8	92	5	207	200	625
II. Clayton	339	4	1·2	61	1	180	179	250
III. Ardwick	1,352	36	2·7	268	16	198	191	444
III. Openshaw	930	26	2·8	191	8	205	202	308
III. Gorton (West)	912	34	3·7	181	18	198	186	529
III. Rusholme and Kirk.	788	26	3·3	99	8	126	119	308
III. Chorlton-on-Medlock	1,430	109	7·6	250	32	175	165	294
III. Hulme	2,247	123	5·5	464	43	207	198	350

TABLE J, 1904.

Infantile Mortality in the City, and its Three Main Divisions.

Death-rates under One Year per 1,000 Births.

Causes of Death	City of Manchester	Manchester Township	North Manchester	South Manchester
All Causes	186·71	208·09	165·59	189·71
Measles	4·73	3·27	2·95	6·79
Whooping Cough	6·97	7·72	8·31	5·61
Other Com: Infectious Diseases†	1·09	1·40	0·92	1·04
Diarrhœal Diseases	34·06	40·92	30·09	33·03
Tubercular Diseases‡	7·03	5·85	3·88	9·92
Convulsions	8·82	8·65	8·86	8·88
Other Nervous Diseases§	3·52	2·34	4·61	3·39
Lung Diseases	36·02	41·38	31·94	35·91
Wasting Diseases ‖	30·37	35·54	27·32	29·64
Suffocation	0·52	0·70	......	0·78
Found dead in bed	3·75	6·08	2·40	3·39

† These are Smallpox, Scarlatina, Diphtheria, Membranous Croup, and various forms of "Fever," including the chief forms of Typhus and Typhoid.

‡ These are Phthisis, Tubercular Meningitis (Hydrocephalus), Tabes Mesenterica, and General Tuberculosis (Scrofula).

§ These are Meningitis, and other diseases of the Brain and Spinal Cord.

‖ These are Premature Birth, and such ill-defined causes as Atrophy, Marasmus, Debility, Inanition, &c.

TABLE K, 1904.—CITY OF MANCHESTER. ANNUAL RATES OF MORTALITY PER 1,000 PERSONS LIVING AT ALL AGES, IN THE CITY OF MANCHESTER AND IN ITS STATISTICAL DIVISIONS, FROM CERTAIN DISEASES AND GROUPS OF DISEASES.

CAUSES OF DEATH	City of Manchester	Manchester Township	North Manchester	South Manchester	City of Manchester Average of 10 years 1894-1903
All Causes	20·89	26.75	17·12	20·51	21·87
Smallpox	0·02	0·02	0·03	0·01	0·01
Measles	0·76	0·86	0·50	0·89	0·74
Scarlet Fever	0·15	0·17	0·16	0·14	0·22
Typhus Fever	...	...	...	...	...
Influenza	0·17	0·18	0·14	0·19	0·22
Whooping Cough	0·50	0·70	0·47	0·42	0·49
Diphtheria, and Memb: Croup	0·18	0·13	0·22	0·17	0·19
Ill-defined Fever	0·00	...	0·01	...	0·01
Enteric Fever	0·12	0·15	0·11	0·11	0·17
Diarrhœal Diseases	1·36	1·86	1·16	1·25	1·42
Puerperal Fever	0·03	0·04	0·02	0·04	0·05
Erysipelas	0·05	0·07	0·06	0·03	0·05
Pyæmia, Septicæmia	0·05	0·10	0·04	0·04	0·03
Phthisis (Tuberc: Pulmon:)	1·98	3·14	1·23	1·90	2·04
Tubercular Meningitis	0·26	0·31	0·15	0·32	0·29
Tuberc: Periton: Tabes Mes:	0·15	0·11	0·10	0·20	0·19
Tuberculous Dis: (other)	0·28	0·37	0·16	0·30	0·37
Alcoholism	0·14	0·28	0·05	0·13	0·12
Cancer	0·81	0·95	0·58	0·90	0·73
Rheumatic Fever	0·07	0·05	0·07	0·08	0·07
Premature Birth	0·67	0·71	0·58	0·71	0·62
Nervous Diseases	1·17	1·46	1·14	1·05	1·32
Heart and Blood Vessels Diseases	2·71	3·24	2·37	2·67	2·52
Bronchitis	2·18	3·20	1·66	2·01	2·15
Pneumonia	1·97	2·35	1·60	2·04	2·39
Respiratory Diseases (other)	0·23	0·23	0·18	0·26	0·31
Digestive Organs (Diseases of)	1·02	1·37	0·93	0·89	1·01
Urinary Organs (Diseases of)	0·50	0·57	0·35	0·57	0·50
Old Age	0·49	0·49	0·42	0·54	0·41

TABLE L, 1904.

MANCHESTER.—Certification of the Causes of Death in the Main Divisions and in Districts.

Statistical Divisions.	Total Deaths	Certified by: Registered Medical Practitioners	Certified by: Coroner	Not Certified	Proportion per cent. of Deaths — Certified by: Regist'd Medical Prac-titioners	Proportion per cent. of Deaths — Certified by: Coroner	Proportion per cent. of Deaths — Not Certified
City of Manchester	11,666	10,763	684	219	92·2	5·9	1·9
I. Manchester Township ...	3,497	3,184	230	83	91·0	6·6	2·4
II. North Manchester	3,032	2,817	164	51	92·9	5·4	1·7
III. South Manchester	5,137	4,762	290	85	92·7	5·6	1·7
I. Ancoats	1,138	1,048	64	26	92·1	5·6	2·3
I. Central	819	731	64	24	89·3	7·8	2·9
I. St. George's	1,540	1,405	102	33	91·3	6·6	2·1
II. Cheetham	524	480	35	9	91·6	6·7	1·7
II. Crumpsall	135	126	3	6	93·4	2·2	4·4
II. Blackley	153	147	4	2	96·1	2·6	1·3
II. Harpurhey	319	296	17	6	92·8	5·3	1·9
II. Moston	225	212	9	4	94·2	4·0	1·8
II. Newton Heath	715	660	45	10	92·3	6·3	1·4
II. Bradford..................	529	495	28	6	93·5	5·3	1·2
II. Beswick	279	258	15	6	92·4	5·4	2·2
II. Clayton	153	143	8	2	93·5	5·2	1·3
III. Ardwick	866	806	48	12	93·1	5·5	1·4
III. Openshaw	589	560	22	7	95·1	3·7	1·2
III. Gorton (West)	535	504	24	7	94·2	4·5	1·3
III. Rusholme and Kirk. ...	413	385	22	6	93·2	5·3	1·5
III. Chorlton-upon-Medlock	1,144	1,052	68	24	92·0	5·9	2·1
III. Hulme	1,590	1,455	106	29	91·5	6·7	1·8

TABLE M, 1904—CITY OF MANCHESTER.—ANNUAL RATES OF MORTALITY AT SIX GROUPS OF AGES, * PER 1,000 LIVING AT THOSE AGE GROUPS, FROM CERTAIN PREVALENT DISEASES, AND GROUPS OF DISEASES.

Causes of Death		Under 5 Years	5 to 14 Years	15 to 24 Years	25 to 44 Years	45 to 64 Years	65 Years and upwards
All Causes		75·75	3·71	4·15	9·40	31·33	109·47
Smallpox		0·02	...	0·03	0·02	0·01	...
Measles		6·24	0·13	...	...	...	...
Scarlatina		0·88	0·21	...	0·01	0·01	...
Diphtheria, Memb. Croup		1·00	0·28	0·01	...	...	...
Whooping Cough		4·09	0·10	...	...	...	...
Fever	Typhus	...	...	...	...	...	...
	Enteric	0·05	0·04	0·17	0·17	0·12	...
	Continued	...	...	...	...	...	0·06
Diarrhœal Diseases		11·33	0·03	0·01	0·01	0·04	0·44
Tubercular Diseases		4·26	0·92	1·80	3·14	4·31	2·06
Malignant Disease		0·06	0·02	0·03	0·50	3·29	6·32
Diseases of	Nervous System	4·75	0·24	0·18	0·64	1·50	4·32
	Heart and Blood Vessels	0·52	0·31	0·38	1·24	7·94	35·53
	Respiratory System	16·56	0·47	0·45	1·37	7·29	28·09
	Digestive System	4·08	0·23	0·28	0·42	1·55	3·07
	Urinary System	0·29	0·03	0·12	0·40	1·56	3·38
Other Diseases		21·64	0·70	0·68	1·48	3·70	26·21

* For death-rates at all ages, see Table K.

TABLE N, 1904.—ANNUAL RATES OF MORTALITY IN STATISTICAL DIVISIONS AT SIX GROUPS OF AGES, * PER 1,000 LIVING AT THOSE AGE GROUPS, FROM CERTAIN PREVALENT DISEASES, AND GROUPS OF DISEASES.

CAUSES OF DEATH	Under 5 Years			5 to 14 Years			15 to 24 Years		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes	94·11	61·04	77·11	4·59	3·26	3·58	5·24	3·75	3·88
Smallpox	...	0·05	...	...	...	...	...	0·05	0·04
Measles	7·02	3·80	7·69	0·15	0·16	0·10	...	...	...
Scarlatina	1·04	1·05	0·67	0·23	0·13	0·26	...	...	...
Diphtheria, Memb. Croup	0·84	1·05	1·05	0·15	0·42	0·24	...	...	0·02
Whooping Cough	5·78	3·70	3·47	0·11	0·05	0·12	...	...	...
Fever — Typhus	...	...	...	...	...	...	...	...	...
Fever — Enteric	...	0·05	0·07	0·08	0·05	0·02	0·30	0·16	0·12
Fever — Continued	...	...	...	...	...	...	...	...	...
Diarrhœal Diseases	15·66	9·14	10·67	0·04	...	0·04	...	...	0·02
Tubercular Diseases	4·61	2·19	5·65	1·24	0·78	0·84	2·32	1·43	1·81
Malignant Disease	...	...	0·14	...	0·03	0·02	...	0·05	0·02
Diseases of — Nervous System	5·07	4·89	4·46	0·26	0·23	0·24	0·34	0·19	0·10
Diseases of — Heart & Blood Vess:	0·58	0·41	0·56	0·30	0·29	0·34	0·41	0·38	0·37
Diseases of — Respiratory System	20·66	13·26	16·88	0·79	0·29	0·44	0·72	0·38	0·37
Diseases of — Digestive System	6·30	3·11	3·61	0·41	0·23	0·12	0·38	0·32	0·19
Diseases of — Urinary System	0·32	0·27	0·28	0·08	0·03	0·02	0·23	0·11	0·08
Other Diseases	26·25	18·06	21·90	0·75	0·57	0·76	0·57	0·67	0·74

CAUSES OF DEATH	25 to 44 Years			45 to 64 Years			65 Years and upwards		
	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester	Manchester Township	North Manchester	South Manchester
All Causes	13·15	7·97	8·51	40·11	25·81	30·00	121·50	94·90	111·83
Smallpox	0·03	0·04	...	0·05	...	...	...	...	...
Measles	...	...	...	...	...	...	...	...	...
Scarlatina	...	...	0·03	...	...	0·03	...	...	...
Diphtheria, Memb. Croup	...	...	...	...	...	...	...	...	...
Whooping Cough	...	...	...	...	...	...	...	...	...
Fever — Typhus	...	...	...	...	...	...	...	...	...
Fever — Enteric	0·16	0·19	0·17	0·15	0·04	0·14	...	...	...
Fever — Continued	...	...	...	...	...	...	...	0·22	...
Diarrhœal Diseases	..	0·02	0·01	...	0·13	...	0·25	0·44	0·54
Tubercular Diseases	4·75	2·18	2·99	7·50	1·91	4·06	5·16	0·44	1·36
Malignant Disease	0·67	0·36	0·52	3·57	2·53	3·62	6·89	5·27	6·65
Diseases of — Nervous System	0·93	0·61	0·49	2·09	1·47	1·20	4·43	3·08	5·02
Diseases of — Heart & Blood Vess:	1·50	1·35	1·04	8·47	8·00	7·63	42·06	29·66	35·56
Diseases of — Respiratory System	1·97	1·14	1·22	9·85	6·31	6·51	31·73	20·43	30·81
Diseases of — Digestive System	0·57	0·40	0·36	1·63	1·69	1·42	1·72	3·51	3·53
Diseases of — Urinary System	0·54	0·27	0·41	1·53	0·93	1·98	2·71	3·51	3·66
Other Diseases	1·97	1·42	1·27	5·26	2·80	3·42	26·56	28·34	24·70

* For death-rates at all ages, see Table K.

TABLE O, 1904.—PARTICULARS AS TO MANCHESTER PATIENTS UNDER TREATMENT IN THE SEVERAL FEVER HOSPITALS DURING THE YEAR; ALSO OF PATIENTS FROM OUTSIDE DISTRICTS SENT TO MONSALL AND CLAYTON DURING THE SAME PERIOD.

Disease	Hospital	In Hospital commencement of year	Admitted	Discharged	Died	Remaining in Hospital close of year
Smallpox	Clayton Hospital	8	134	128	10	4
	Total	8	134	128	10	4
Scarlet Fever	Monsall	200	1,643	1,467	56	320
	Other Hospitals	...	9	7	2	...
	Total	200	1,652	1,474	58	320
Diphtheria	Monsall	16	257	181	42	50
	Other Hospitals	...	2	1	1	...
	Total	16	259	182	43	50
Enteric Fever	Monsall	49	208	204	27	26
	Other Hospitals	4	20	12	6	6
	Total	53	228	216	33	32
Typhus Fever	Monsall	...	...	...	...	...
	Other Hospitals	...	...	...	...	...
	Total	...	...	...	...	..
Other Acute Diseases	Monsall	12	276	223	32	33
	Other Hospitals	...	17	6	...	11
	Total	12	293	229	32	44
All Diseases		289	2,566	2,229	176	450

PATIENTS SENT TO MONSALL OR CLAYTON, FROM DISTRICTS OUTSIDE THE CITY, DURING THE YEAR 1904.

Disease	Audenshaw	Eye Hospital	Northern Hospital	Swinton Schools	Royal Infirmary	Southern Hospital	Pendlebury Hospital	Withington	Moss Side	Heaton Norris	Broughton
Smallpox	...	...	...	...	...	...	...	3	3	4	1
Scarlatina	2	...	...	1	...	...	10	...	...	...	...
Diphtheria	...	1	1	...	1	1	2	...	...	...	...
Enteric Fever	...	...	...	...	2	...	...	...	...	...	...
Other Diseases	...	...	...	...	4	...	...	...	...	...	...

Total, 36.

TABLE P, 1904.—Work of Sanitary Department for the Year.

	Ancoats	Central	St. George's	Cheetham	Crumpsall	Blackley	Harpurhey	Moston	Newton	Bradford	Beswick	Clayton	Ardwick	Openshaw	Gorton (West)	Rusholme and Kirkmanshulme	Chorlton-upon-Medlock	Hulme	Moss Side (Incorporated Nov. 1904)	TOTALS
	TOWNSHIPS																			
Complaints to Sanitary Superintendent ...	742	784	1,025	766	176	133	399	201	677	730	233	269	850	771	359	602	1,392	1,716	25	11,850
Inspections of Dwelling-houses	8,676	6,931	6,206	5,460	574	707	1,053	1,202	4,808	2,411	1,682	1,281	3,094	2,876	2,798	2,039	4,046	8,350	65	64,259
Inspections of Newly-infected Dwelling-houses	236	93	333	249	49	76	87	62	214	187	104	82	194	170	179	151	216	383	13	3,078
Inspections of Cellars	2	5	1	...	4	...	...	...	...	1	...	...	4	11	...	...	108	1	...	137
Inspections of Schools	6	...	9	2	2	...	...	...	4	7	1	...	4	5	...	2	6	...	...	48
Inspections of Factories and Workshops	79	...	79	5	4	9	...	1	7	1	3	...	...	...	1	...	3	3	...	195
Inspections of Lodging-houses	263	1,077	799	517	...	...	...	...	17	17	2	...	2	14	...	63	200	403	...	3,374
Inspections of Offensive Trades	13	11	157	22	2	2	...	12	10	12	...	12	21	...	45	5	3	4	...	331
Inspections of Dairies and Milkshops	283	999	445	154	15	7	18	89	52	105	27	55	25	35	53	131	179	348	103	3,123
Inspections of Bakehouses	248	693	325	1,016	21	7	137	24	96	73	3	18	94	42	125	97	374	569	78	4,040
Inspections of Canal Boats	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,838
Inspections of Slaughter-houses	...	...	...	...	...	...	...	...	...	1	...	...	...	...	14	11	1	1	...	28
Inspections of Tips for Refuse	2	...	1	...	...	2	8	122	2	1	41	20	...	37	...	...	1	...	...	237
Miscellaneous Inspections	748	1,468	823	616	93	106	96	269	97	353	202	367	434	783	554	202	1,420	3,668	41	12,340
Inspections of Factories and Workshops by Shop Hours, &c., Inspectors	1,328	5,318	1,491	2,763	38	31	185	46	341	189	4	55	180	177	136	121	892	1,007	199	14,501
Inspections of Shops by Shop Hours, &c., Inspectors	215	1,236	193	555	1	...	206	...	158	37	2	...	94	276	77	193	451	465	...	4,159
Infected Rooms Disinfected	852	370	757	406	103	122	201	163	606	119	267	10	932	599	507	216	340	1,654	9	8,233
Infected Dwellings Re-inspected	706	171	875	540	51	162	215	182	419	327	383	541	258	266	171	435	589	761	28	7,080
Drains Tested by Water	468	260	600	283	67	100	212	75	335	163	235	...	237	157	374	399	506	644	6	5,121
Smoke Abatement: Observations made	47	36	27	40	8	7	8	5	55	68	...	27	21	37	15	3	12	34	...	450
Smoke Abatement: Proceedings before Magistrates	9	18	7	7	3	4	4	4	14	13	...	6	6	9	5	2	4	5	...	120
Food Adulteration: Samples Collected for Analysis	218	214	188	103	18	13	35	16	64	67	...	32	76	66	71	98	290	262	1	*1,844
Food Adulteration: Proceedings before Magistrates	12	42	7	2	...	...	3	...	2	1	...	2	1	1	...	2	11	3	...	89
Ashpits reported to Cleansing Department for emptying	54	13	14	10	149	80	176	62	132	32	20	231	14	28	110	118	6	8	...	1,257
Receptacles reported to Cleansing Department for emptying	131	65	134	579	...	1	80	1	32	7	154	...	29	5	10	57	49	70	...	1,404
Notices issued for Abatement of Nuisances	1,014	1,145	1,319	1,426	90	131	182	148	482	411	335	88	625	207	403	537	852	1,537	33	10,965
Letters written for Abatement of Nuisances	94	80	116	163	4	5	2	3	47	38	3	6	41	13	19	41	56	104	...	835
Reports made to Medical Officer of Health	752	469	916	715	163	146	402	190	626	653	216	281	706	687	716	478	1,090	1,476	1	10,683
Legal proceedings taken	27	23	14	20	...	...	...	...	2	8	2	...	4	2	2	4	21	14	...	†146
Total Nuisances abated	977	977	1,201	1,219	92	117	206	139	475	350	342	81	611	256	204	567	789	1,346	22	9,971
‡ Number of Cottages under Five Rooms	7,435	4,964	9,037	729	522	923	688	367	4,409	2,621	1,285	402	4,552	3,510	3,221	826	3,805	8,167	...	57,463

* 12 Samples procured from Outside the City. † 3 cases Infringement of Canal Boats Acts. ‡ Census 1901.

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